

AUTOMOTIVE INDUSTRIES

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Contents

Repercussion—An Export Factor. By Leslie Peat	643
Applications of Tolerance Systems Depend Upon Nature of Production Process. By John Gaillard	646
S.A.E. Hears Scientific Analysis of Competency. By Herbert Hosking	650
Gasoline Engine Experience May Aid Development of Oil Powerplant. By Robertson Matthews	651
High Speeds Change Road Standards.	653
Performance of Valve Mechanisms is Recorded by Specially Designed Line of Instruments. By Ferdinand Jehle	654
Just Among Ourselves	659
Research Facilities Improved at New AC Spark Plug Laboratories	660
The Forum—Peugeot and Citroen Favor Tariff.	663
New Developments	664
Automotive Oddities	666
News of the Industry	667
Men of the Industry	668
Calendar of Events	678
Advertisers' Index	106, 107

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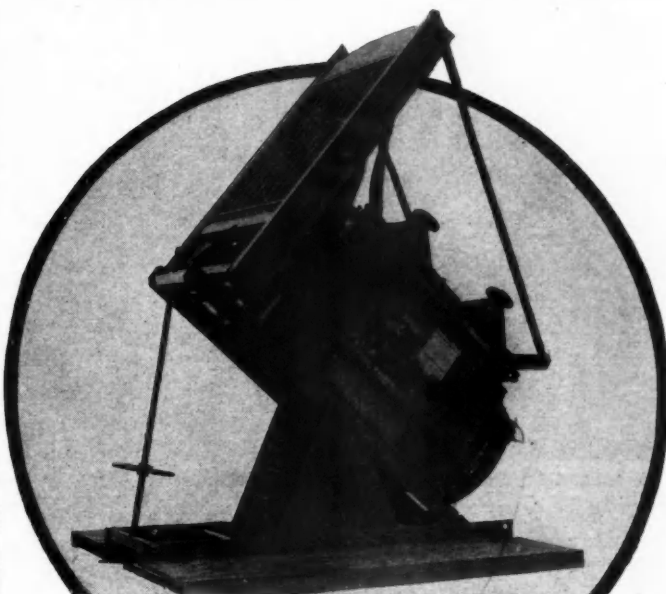
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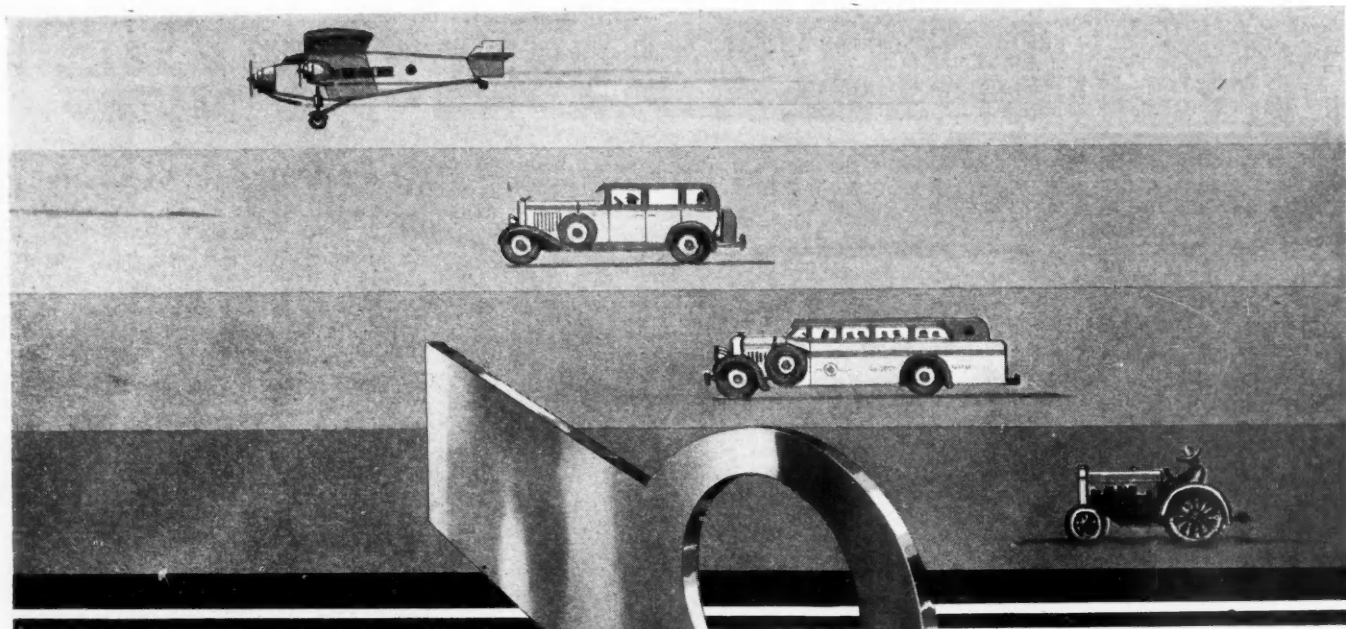
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AUTOMOTIVE INDUSTRIES

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NUMBER 17

Foreign trade outlets are essential to our prosperity. Are we encouraging retaliatory tariffs abroad? If so, we face the problem of



REPERCUSSION—AN EXPORT FACTOR

WHEN the eighteenth annual meeting of the Chamber of Commerce of the United

States opens in Washington on April 28, the automobile industry will watch with particular interest the disposition of the question of foreign trade.

In the face of the recent retaliatory tariff adopted by the French Chamber of Deputies against American automobiles, the industry is expected to show considerable activity on the proposal of the National Automobile Chamber of Commerce that the board of directors of the United States Chamber should provide for a complete study of the tariff question, based on an analysis of the existing and probable world trade developments, with special reference to consideration of export trade.

History has established the fact that tariffs passed by Congress have been aimed at imports; questions of balancing tariffs to prevent the foreign discrimination against American goods have been largely confined to academic discussions and debates. Subscribing to the principle of protective tariffs, the industry as a whole is greatly interested in some basic study of the economics of the tariff which would help to bring about a duty schedule designed to protect industry in fact, without encouraging retaliatory measures on the part of countries which form an out-

By Leslie Peat

let for a sizable share of industry's output.

Export markets take as many automobiles as 29 states in our Union. Any menace to this outlet would naturally have a far-reaching effect on decreasing chances for domestic prosperity and earning ability of American automobile companies. A further misfortune is the likelihood that no substitute in the way of increased domestic demand could be offered for the loss of exports.

Leaders in the industry hold that it is urgent that some serious study be made of the likely effects that our tariff will have on exports of automobiles and of the repercussions to be felt in the domestic business as well.

There seems to be no doubt that resentment is growing against this country as a result of the excessive duties being advocated against imports.

The recent action by the French is a typical example. The already excessive duty of 90 per cent on French lace was raised, and yet somehow the feeling prevailed among Americans that our automobiles should not in turn be subjected to comparable high duties by the French.

Similar action may be expected in nearly all countries of the world. Where American agricultural rates fail to hurt, the industrial duties make up for

NEW FRENCH AUTOMOBILE DUTIES BY WEIGHT

A Table Showing How Duties are Reckoned by Weight, Under the New Law
Which Became Effective on April 19

Cars Weighing (Kilos) ⁽¹⁾	Class ⁽²⁾	Equivalent in Pounds	Francs ⁽³⁾ per 100 Kilos	Dollars Per 100 Kilos	Dollars Per Pound
Under 1100	A	2425	800	31.34	0.142
1100 to 1500	B	2425 to 3307	925	36.24	0.164
1500 to 1750	C	3307 to 3858	1,050	41.14	0.185
1750 to 2000	D	3858 to 4409	1,275	49.95	0.226
Over 2000	E	over 4409	1,500	58.77	0.266

(2) For ease in comparing both tables.

(4) 1 Kilo equals 2.2046 lb.

(5) 1 Franc equals \$0.039179.

failure. In nearly every foreign country, whether agricultural or industrial, there are being found causes for restiveness as result of our proposed tariff without regard to effects on America's trade relation with the whole world.

Is it possible that we have become "sectional-conscious" and blind to the nation's collective welfare?

No one will deny the right of American industries to reasonable protection, but when individual requests reach such heights as to jeopardize the prosperity of large and efficiently conducted businesses with their far-reaching effects on the well-being of a considerable part of America's population, it becomes necessary to pause and seriously to consider the consequences.

In World or Domestic Trade

The main question that will have to be answered is: Will the people of the United States as a whole be better off if the world is antagonized by excessive duties and if markets are limited to this country chiefly, or will they fare better by a policy of reasonableness that assures demand for American labor, materials and services for the production and distribution of goods that find buyers throughout the world?

The automobile industry offers an excellent illustration. It is the largest of any in the United States. Its prosperity determines the well-being of numerous enterprises engaged in supplying materials. The ramifications applicable to the conditions of labor are well known. With 12,000,000 people dependent for livelihood on some form of automotive activity, it is quite apparent that, as goes the prosperity of the automobile industry, so goes that of the whole nation.

And yet steps can be taken through a tariff, conceived without consideration of economics, to destroy an outlet for American materials and employment of labor in connection with about 1,000,000 export cars.

Actions of this kind are possible only because of failure to realize the link between United States exports and domestic prosperity.

Another reason may be in-

ability to grasp the basis on which true prosperity is built.

After all, 80 per cent of the families in the United States are supposed to have incomes of less than \$2,000 a year. These people, being so numerous, determine whether goods shall be consumed in large quantities or small. Decision one way or the other determines whether agriculture and industries shall continue to produce in sufficient quantities to warrant large scale employment of labor.

Masses as Buyers

The masses possessing a relatively fixed total income can spend only so much. They can, however, help agriculture and industry and cause employment of labor, but only as they receive an increasing, rather than decreasing, quantity of goods for the rather fixed sum of money available to them.

The question is whether our proposed tariff is going to help the American people as a whole to obtain for their money more or fewer goods than formerly. If they obtain less goods for the same money as previously, then there will be less need for the output of agriculture and industry. An incidental result will also be less need for employment of labor. Such a tendency will naturally harass rather than help the return to normalcy.

Will the United States tariff as now planned help to bring commodities of all kinds within the purchasing reach of the great masses whose consuming power when converted into productive channels spells prosperity or depression?

Higher rather than lower prices are anticipated once the tariff is effective.

Naturally, higher prices for finished articles will have to follow. The process of placing commodities outside of the purchasing reach of the masses will have started and will bring with it the adverse effects on production and labor. The demand for goods heretofore existing will have to recede and by necessity become inarticulate.

The greater part of the American people has been employed in industries which

A GAGE FOR THE NATION

With approximately 12,000,000 people dependent upon the automotive industry for a livelihood, it is apparent that the prosperity of the industry reflects the prosperity of the nation. The automobile and allied enterprises were kept going two months of last year by the demand from abroad for our automobiles. This export outlet is endangered by retaliatory tariffs, the first of which was enacted by France recently.

were enabled, just because of attractive prices, to sell their products in all parts of the world.

The automobile industry and allied enterprises with their armies of workmen have been kept going two months of last year because of the demand from abroad for our attractively priced automobiles.

The factor of materials is likely to weaken this advantage in the future under the proposed United States tariff.

Even assuming that the American market is ample to consume all that is produced here—a fact known to be incorrect—the use of American factories, equipment, materials and labor will be penalized whenever goods are destined for abroad and exposed to international competition with rivals that are less hampered by tariff inflated prices for materials entering into their products.

Visiting cotton mill owners from Holland have indicated already intentions to buy their raw materials elsewhere, if the cotton prices, as result of United States tariff, rise artificially. Antagonizing of foreign markets is sure to have most depressing effect on a branch of agriculture that, like the automobile, is dependent on export markets for a major outlet.

Supplies' Outlet Curtailed

As far as the export portion of American automobile sales—now reaching 18 per cent of total—there is likely to be an increasing loss as far as suppliers of materials are concerned.

It is quite possible that materials required on export cars will no longer be purchased from American suppliers as up to now, but instead brought in duty free under customs bond and worked into the final article for reexportation. Any such change is naturally going to affect employees in the factories which have supplied these materials up to now.

Our national tariff policy, even as it is now applied, is inducing a migration of demand for labor and materials from United States to foreign countries. The new tariff will accentuate the trend and contribute to

EXPORT MARKETS ESSENTIAL

"Experience may yet serve to bring home the evident fact that a policy adopted when the United States was a debtor nation, with inadequate production facilities to supply its own needs, is no longer suitable for a creditor nation with an excess of products and a dependence upon export markets for full economic use of facilities, or for the continuation of national prosperity."

increasing discomfort of people who have been dependent on these activities for their livelihood.

Increasing manufacture of American cars abroad is proof of this. The freight advantage alone, now that cars are being shipped unboxed to many countries, is not the sole reason for duplication of manufacturing facilities. The real reason lies with the United States tariff policy which is encouraging retaliations with high duties against American automobiles and compelling an increasing use of foreign labor and material at the expense of American firms and workmen.

In certain countries, this duplication has reached a point where 70 per cent and even more, if a car is made with local material and by local labor. Glass is purchased in Czechoslovakia for use in cars assembled in Argentina. This trend is likely to be even more pronounced in the face of our proposed tariff.

Can Export Loss Be Absorbed?

The question that naturally comes to mind is whether the industries that are being protected by excessive duties at the expense of major enterprises, including agriculture, which need large export outlets, will take up the slack of employment certain to result with the transition. Several automobile manufacturers have some doubt about this.

Experience, they think, may bring home the painful fact that a policy adopted for our country when it was a *debtor country*, with inadequate production facilities to supply its own needs, is no longer suitable for a *creditor nation* with an excess of products and a dependence on exports for continued National prosperity.

Agriculture, they suggest, will then realize that 2,000,000,000 people inhabit the world and that lower prices attained as a result of cooperative economies in cultivation, rather than tariff inflated prices, stimulate buying by the masses in the United States and throughout the world.

(Continued on page 658)

WHAT THE FRENCH TARIFF MEANS

New And Old Duties Payable on American Automobiles Shipped Into France Under New Law Which Became Effective April 19

Make ¹	Class ²	Shipping Weight in Kilos ⁴	List Price ³	New Duty	Former Duty ⁵	Equivalent Ad Valorem Rate Under New Schedule
Ford	B	1114	\$625	\$403.71	\$281.25	64.5
Chevrolet	B	1132	675	410.24	303.75	60.7
Essex	B	1275	825	462.06	371.25	56.0
Studebaker (Dictator 8)	B	1408	1,285	510.26	528.25	39.8

(1) Figures based on passenger sedans.

(2) For ease in comparing both tables.

(3) Practically equivalent to dutiable value under present custom-house practice.

(4) 1 Kilo equals 2.2046 lb.

(5) 1 Franc equals \$0.039179.

(6) 45% ad valorem based on list price.

Application of Tolerance System of Production Process

Relative merits of the unilateral and bilateral methods have a national aspect. Each has both an engineering and a production angle, with many unique problems.

IN 1925 a Tentative American Standard for "Tolerances, allowances and gages for metal fits" was approved by the American Standards Association (ASA). This standard specifies eight different fits between two mating parts of a certain nominal size.

Thus, the diagrams in Fig. 1 represent the eight standard fits between mating parts with a nominal size of 1 in. The nominal size is represented by the line 0-0. The cross-hatched bars are the tolerances on the eight holes adopted for the standard fits. The solid black bars represent the tolerances on the shafts to be combined with the eight holes. For example, for a free fit (class 2) the size of the hole must lie between 1.0000 and 1.0013 in., and the size of the shaft between 0.9986 and 0.9973 in.

Incidentally, the designer is not limited, in his choice of a fit, to the eight combinations explicitly given in the standard. He may also combine, say a class 2 hole with a class 3 shaft, if this suits his purpose better than either the class 2 or the class 3 combination.

The American standard system is a "unilateral basic hole system." The term "unilateral" (literally: "one-sided") refers to the fact that the tolerance on each mating part—be it a hole or a shaft—is given in only one direction from the basic size of that part. As the basic size of the hole, the nominal size (line 0-0, Fig. 1) has been adopted, and from this line the tolerance on the hole is figured in the upward direction. For example, the tolerance on a 1-in. hole of the class 2 fit is, in workshop terminology, "13 tenths over and nothing under." The basic size of the shaft is its high limit or maximum size (0.9986 in., for a class 2 fit). From this size, a minus tolerance is given on the shaft. The tolerance on the 1-in. shaft of the class 2 fit is "nothing over and 13 tenths under."

The designation "basic hole system" means that the standard fits are obtained by keeping the basic size (low limit) of the hole constant, the difference in fit being

obtained by varying the (basic) size of the mating shaft. Fig. 1 shows clearly that the minimum permissible size of all of the eight holes is the same (namely, the nominal size), while the maximum permissible shaft size increases from the class 1 to the class 8 fit. In this way, fits of decreasing average looseness or increasing average tightness are obtained.

The same series of fits could also be obtained by keeping the basic size (high limit) of all shafts constant—independent of the kind of fit—and by varying the basic size of the holes in order to obtain the different fits desired. The eight American standard fits, "translated" in this way into such a "basic shaft system," are shown in Fig. 2 (these fits do not form part of the American standard). Whether the basic hole or the basic shaft system should preferably be used, depends entirely on the nature of the product manufactured and on the conditions under which it is made. It would lead us too far to go into this question here, as it even may involve such factors as the number of parts made per hour, and the combination of different fits on the same shaft. It may be interesting to mention, however, that all existing or proposed national standard systems of fits (except the American and the British) give both the basic hole and the basic shaft system. The idea of giving both systems is that every branch of industry shall be able to select that system most suitable for its work.

With regard to the question of tolerances, there still is raised, occasionally, the question whether so-called "bilateral" (literally: "two-sided") tolerances are not preferable to "unilateral." A bilateral tolerance consists of two permissible variations in the size of a part, one on either side of its basic size, that is—a plus and a minus variation. Fig. 3 shows, side by side, the diagrams for a specific clearance fit between mating parts with a nominal size of 1 in., specified in unilateral and in bilateral tolerances. Evidently, there is no difference what-

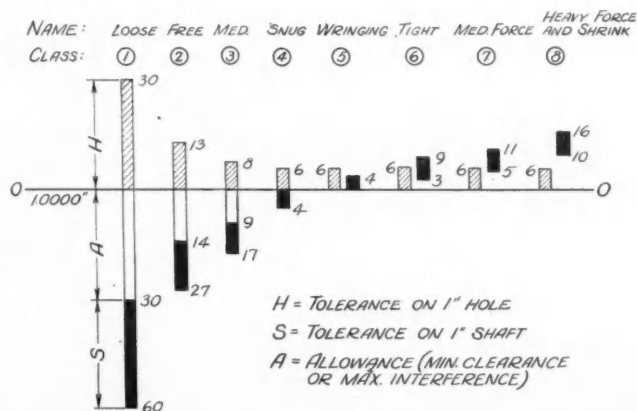


Fig. 1—The eight American standard fits between mating parts with a nominal size of 1 in.

Depends upon Nature

By JOHN GAILLARD

Mechanical Engineer, American Standards Association

ever between the conditions of fit which may actually occur in either system. In both cases, the minimum clearance is 0.0009 in., and the maximum clearance 0.0025 in. Also, the useful life of the reamer required for finishing the hole is the same in both cases, its total permissible wear being practically equal to the tolerance on the hole. This holds good only, of course, if a new reamer is given a size very close to the maximum permissible size of the hole. Evidently, a reamer with a size very close to the nominal size of the hole (1 in., in this case), has more "wear" left for the hole with the bilateral tolerance than for the hole with the unilateral tolerance. This is a separate question, however, to which we may refer again in more detail on a future occasion.

Why then are the American standard fits (and all foreign ones) specified by means of unilateral tolerances and not of bilateral?

Before discussing the relative merits of the unilateral and the bilateral systems, attention should be called to the primary purpose of a national standard system of fits. This purpose is to secure the manufacture of interchangeable parts in mass production methods as applied by the major industries concerned. By interchangeable parts, we understand parts made in lots or in continuous flow production—usually on semi-automatic or full-automatic machines—with such degree of accuracy in size as to be at once ready for assembly.

This requirement of a national standard system should be kept well in mind, as it has had a decisive influence on the choice between unilateral and bilateral tolerances.

To proceed regularly, we shall now review both systems, first from the viewpoint of the engineering department, and second, from that of the production department. The former specifies the fits, the latter must actually establish them. Both have a fundamental interest in using that system which is most effective, all factors being considered.

Taking a concrete example, the engineering department, in specifying the fit represented by the diagrams, Fig. 3, might express the

Tolerance Standards

The subject of tolerances for metal fits has been a standing topic of discussion in engineering and production circles for many years. The accompanying article answers the question—briefly and informatively—of "Why was the unilateral system chosen as the American standard?"

limits of the parts in the unilateral system (diagram A) as follows:

Hole	1.0000	+ .0012
		— .0
		+ .0
Shaft	0.9991	— .0008

and in the bilateral system (diagram B) as follows:

Hole	1.0000 ± .0006
Shaft	.9981 ± .0004

The latter method of indication has a simpler appearance than the former. However, if we try to visualize the limiting conditions of fit (minimum and maximum permissible clearance), the unilateral method appears to be decidedly preferable. In fact, the difference (1.0000 — 0.9991) = 0.0009 in., gives us at once the minimum clearance. Adding the sum of the tolerances (0.0020 in.) to this minimum clearance, we find the maximum clearance of 0.0029 in.

In the bilateral system, the simplest way to find the minimum clearance is to take the difference of the basic sizes (1.0000 — 0.9981) = 0.0019 in., and subtract from this value half the sum of the tolerances: 0.0019 — ½ (0.0012 + 0.0008) = 0.0009 in. The maximum clearance may then be found in the same way as for the unilateral system.

Evidently, the latter procedure is somewhat more complicated than the former, and the unilateral system is no doubt the better one,

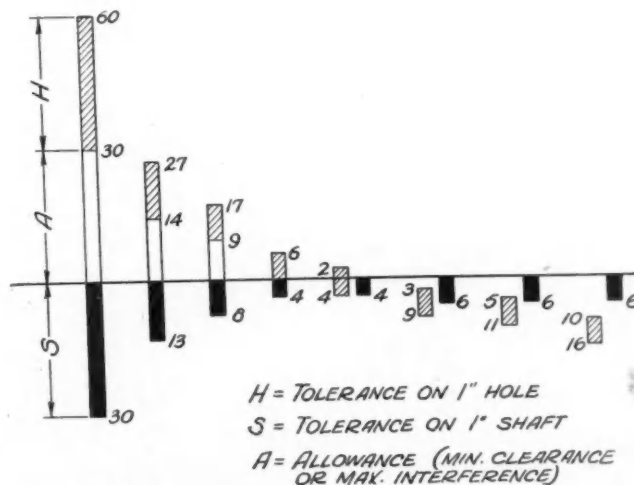


Fig. 2—Eight fits in "basic shaft" system, corresponding to the eight American standard fits shown in Fig. 1

from this point of view, because it involves less steps in the process of visualizing, specifying, and recording the fits, and consequently is less liable to let errors slip in.

What Design Involves

The design of a fit involves, first of all, the adoption of a suitable "allowance," i. e., is the minimum clearance or the maximum interference permitted between the mating parts. In the unilateral system, this gives us at once two of the four limits of the mating parts, namely, the low limit of the hole and the high limit of the shaft (see Fig. 3, diagram A). These two limits will not change whatever tolerances on the parts may be adopted. Conversely, possible changes in the tolerances before the several factors controlling the fit are finally adopted do not affect these two limits. They "stay put."

In the bilateral system, on the contrary, none of the four limits can be adopted in a definite way, before the tolerances on both mating parts have been selected. Moreover, a change in the tolerances (or even in the tolerance on one part) entails a change in all of the four limits.

The advantages of the unilateral system explained above with respect to the engineering department are also felt in the production department.

The mere fact that the indication of the limits is simpler and more easily visualized, in the unilateral system, is of course important also in the workshop. Moreover, in the unilateral system the two basic sizes represent the "maximum metal" condition of the mating parts. This is often important with a view to the question how much material must be left on the rough parts for the finishing operation. If the "maximum metal" limit of a part is slightly trespassed, in making the rough part, not much harm is done. For example, if in Fig. 3, diagram A, an unfinished hole has the size X, it still can be finished to an acceptable size. However, if the "minimum metal" limit is trespassed, the part in question must be rejected, no correction of its size being possible in size Y (Fig. 3, diagram A). Therefore, the "maximum metal" limit being the "safest" of the two limits, it is preferable to be able to read at a glance, the exact value of the maximum metal limit of each part. The unilateral system presents this advantage!

Another practical advantage of the unilateral system in the workshop lies in the number of gages required for inspecting a given number of fits, for parts of the same nominal size. This number is smaller for the unilateral, than for the bilateral system, because in the former system the low limit of the hole is the same for all fits. For example, inspecting the three "unilateral" holes of the class 1, 2 and 3 fits, Fig. 1, requires only one "go" plug gage (size 1.0000 in.), and three different "not go" plug gages (sizes 1.0030, 1.0013 and 1.0008 in., respectively). The equivalent "bilateral" fits in Fig. 2, however, would require three different "go" plug gages and three different "not go" gages.

So far, it has been assumed that, once production has begun,

the tolerances on the product remain the same. This is not always so, however, and if the tolerances must be changed after production has gone on for some time, the advantage of the unilateral system over the bilateral becomes still greater. In the first place, a change in the tolerances of both mating parts involves a change in *two* limits in the unilateral system, as against a change in *four* limits in the bilateral system. This applies not only to the drawings, but also to the limit gages. A change in a limit means a change in the gage size. Last but not least, a change in the tolerances may mean, in the bilateral system, the loss of interchangeability between parts made to the original tolerances and those made to the new tolerances. This will be explained in detail below.

Let us assume, for example, that two mating parts of a new machine are first made with unilateral tolerances, as shown in diagram C, Fig. 4 (tolerances 0.0008 in.). After a certain practical experience with the machine, it is found that the tolerances can be widened to 0.0012 in., without detriment to the correct fitting of the parts. This opportunity will be very much welcomed by the manufacturing department since larger tolerances mean lower production cost. Consequently, the original allowance (minimum clearance) is kept, but the tolerances are increased to those in diagram D, Fig. 4. Evidently, there continues to be perfect interchangeability between "old" and "new" parts. No combination of "old" holes and "new" shafts, or conversely, will ever result in a fit being not acceptable because of too small or too large a clearance.

Bilateral Differences

In the bilateral system this is different. Diagrams E and F, Fig. 4, show the same transition from smaller to larger tolerances in the bilateral system, as in diagrams C and D for parts with unilateral tolerances. It will be seen that the bilateral tolerances do *not* guarantee complete interchangeability between "old" and "new" parts. The fits between "old" and "new" parts of some combinations *may* be correct, but a "new" hole F whose size lies below 0.9996 in. (zone a) gives too tight a fit with any "old" shaft whose size is larger than 0.9985 in. (zone b). In a similar way, certain combinations between "old" holes and "new" shafts, or conversely, might result in fits that are too loose.

It has been claimed that since such an increase in tolerances is rather exceptional, it may be practically disregarded. Granting that it is more exceptional than the maintenance of the original tolerances, it is nevertheless an entirely sound procedure. The designer may wish to "play safe," in launching a new machine or apparatus, by keeping the tolerances rather close, and later on, it may appear that larger tolerances are permissible. The opposite condition is much less desirable, as it is easier to "loosen" than to "tighten" the tolerances, in the workshop. If the tolerances are increased, however, it is of the highest importance that no difficulty be caused through lack of interchangeability between parts of the original series of machines, and replacement parts of a more recent

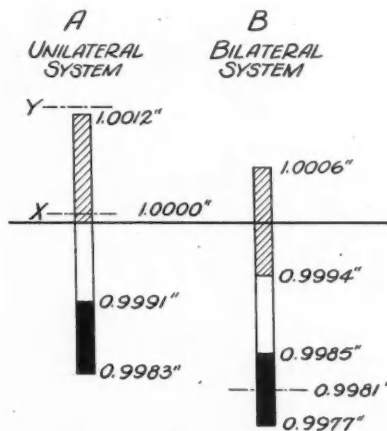


Fig. 3 — Diagrams of the same fit specified in the unilateral (A) and in the bilateral (B) system of tolerances

make of the series.

A situation very much like the above one exists where several fits of the same "class," but of a different "grade," are to be established on the same shaft. The "grade" of a fit depends on the ratio between its "allowance" and the maximum clearance or minimum interference. For example, if two loose fits have the same allowance (minimum permissible clearance), while one has a smaller maximum permissible clearance than the other, the former fit is of a higher "grade" than the latter. Thus

if the minimum permissible clearance of two fits is the same, but their maximum permissible clearances are different, these fits can readily be established, in the unilateral system, on a shaft of uniform diameter, as shown by diagram A, Fig. 3.

In the bilateral system (diagram B, Fig. 3), however, the only way of solving the problem is to give the shaft two different diameters to accommodate the two external parts. This drawback may not be so serious in cases where the basic hole system is used and where, consequently, the shafts are finished to different sizes to match the holes, anyway. It is, however, a handicap in cases where the basic shaft system could be applied and where shafts could be used without requiring a special machine-finish (cold-rolled stock). Such machine-finish would then be required for the sole reason that the two holes have different grades.

Unilateral Advantages

It may be well to emphasize again that the above mentioned advantages of the unilateral system over the bilateral apply particularly to mass production methods, such as those used in the automotive and many other industries. In other words, it is not meant to convey the idea that bilateral tolerances are never justified or even preferable. Cases exist, indeed, where a definite size of a part is considered as being superior, and where consequently the operator is "aiming" at that size. We may also put it in this way: a bilateral tolerance is desirable where a variation in either direction from the basic size is equally undesirable. It will then be more logical to permit a plus and minus variation, than to permit the total variation to be in only one direction from the preferred size.

For example, in manufacturing a shaft which is desired to give a particularly delicate fit with an external part, it may be found that this shaft should be, say 0.9996 in., if it were at all possible to give it an "exact" size. If now, the minimum tolerance which can be held with the machine tool equipment available is 0.0002 in., the desired shaft size must be specified as 0.9996 ± 0.0001 in.

However, if a similar shaft were produced in mass production with the same limits as given above, the

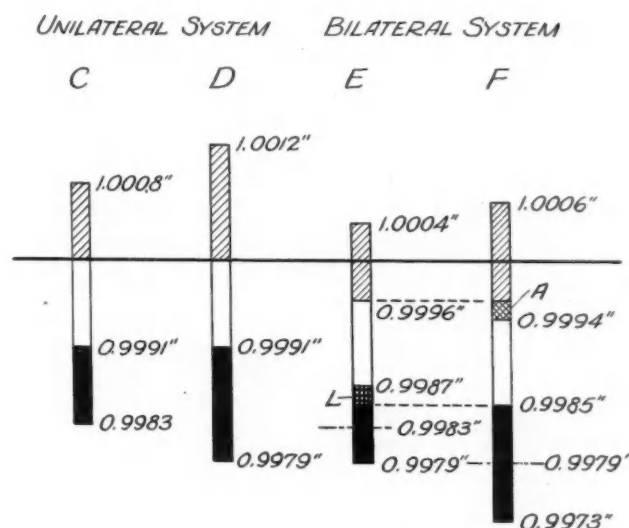


Fig. 4—Influence of change (increase) in tolerances on fits between "old" and "new" parts in the unilateral and in the bilateral system

be no more and no less acceptable than any other. In fact, this is the assumption on which the adoption of the limits was based. Evidently, this method is the one most important for mass production where high speed, long machine runs and suitability of a somewhat larger range of sizes (rather than a very restricted range close to a preferred size) are of essential importance with a view to combine speed of production and speed of assembling.

Influence of Habit

Bilateral tolerances are still being used in many cases where for the reasons explained above, unilateral tolerances should be used. This is probably due in a large measure to force of habit. Bilateral tolerances were the first to be adopted when the necessity of specifying manufacturing limits was recognized. For centuries the craftsman had been thinking exclusively in terms of nominal sizes. He was convinced that he was working to "exact" sizes and thus the concept of "tolerances" did not come to his mind. He was not faced with the problem of interchangeable parts—in fact, he could "nurse" every individual fit to the point where it was practically perfect for his purpose. Therefore, the need of establishing limits did not occur to him. With the development of mass production methods, this need was realized, and the first impulse was then to approximate the "exact" sizes as closely as possible. This tendency naturally led to the adoption of bilateral tolerances. The desire of getting as near as possible to an "exact" size was adhered to more or less unconsciously. The further development of mass production methods entirely did away with the idea of a preferred size and emphasized the modern point of view that all sizes between the limits are good enough. This applies, whether the limits are the "original" ones, or the "selected" ones.

The unilateral system of tolerances, with the nominal size as the reference line, has been adopted or proposed in the national standard systems of fits of 17 countries. In 1906 the British adopted the bilateral system; in 1924 their national standard was revised and the unilateral system was recommended although the bilateral system is still given as a concession to those who had already adopted and worked to the original standard.

problem would be a different one. In fact, there would be no preferred size in this case, but any size between the limits would be equally acceptable. It would then be more advantageous to set the tool to the low limit (0.9995 in.) and allow it to wear down until the size of the shafts produced has reached the high limit (0.9997 in.). The tool must then be reset. The actual size of the parts finished in a run between two resettings of the tool, traverse the entire zone of the tolerance. Within the limits, one size is supposed to

S. A. E. Hears Scientific Analysis of

Competency

By HERBERT HOSKING

TAKING as his springboard topic "The Mental Gears of Engineers," Yale S. Nathanson, of the Department of Psychology of the University of Pennsylvania, plunged into a rapid outline of human competency and its relation to the manufacturing industries, at the monthly meeting of the Philadelphia Section, Society of Engineers, the evening of April 16.

The human being may be likened to a cube, each face of which represents one of the factors present in the individual temperament. The sum of the action and reaction resulting from the presence of these factors is the personality which the individual presents to the world. Each of these factors is known in a special psychological sense as a "competency," and the presence or absence in varying degree of any one of them determines the competency of the individual to pursue a particular line of work, in the generally accepted sense of the word.

The "competencies" and their antitheses were arranged by Mr. Nathanson in the following order, following a classification established by Dr. Lightner Witmer, of the University of Pennsylvania:

Motivation	Control
Intelligence	Efficiency
Intellect	Discrimination

Psychology of the present day predicates that all these competencies are analyzable objectively, according to Mr. Nathanson.

Motivation was defined as the primal impulse which precedes any form of activity on the part of the individual, and "control" as its antithetical quality. Intelligence is the ability of the mind to correlate and profit from previous experience, with relation to a given experience. Efficiency is the ability to deal with a given problem in accordance with the dictates of intelligence. Intellect was defined as the ability to receive and retain knowledge and its antithesis, discrimination, as the ability to perceive and classify differences between types of knowledge acquired.

Continuing the analogy of the cube, Mr. Nathanson said that the ideal individual presents a harmonious balance of his competencies, and that the power of achievement of the individual is related directly to the intensity of development of the competencies. Genius in the individual represents the intensive em-

ergence of one or more of the competencies. The figure of cube no longer holds, and if any analogy is possible, it will fall in the field of non-Euclidean geometry.

Individuals were further classified by Mr. Nathanson into three types, according to the means by which knowledge is most readily acquired. These types are: visual, auditory, and kinaesthetic. The first type is able to "remember" most clearly in terms of visual images, the second in terms of sound, and the third possesses the quality of "muscle memory" which is related to tactile impressions. Most superior individuals fall into the latter classifications, according to Mr. Nathanson, although intensive development of the other types may produce the manifestations of genius.

The relation of clinical psychology to personnel work in the industrial plant was introduced with the statement that it is a fallacy to suppose that the psychological make-up of the individual under consideration with relation to a particular job may be used to determine his fitness. Only by scientific and patient analysis of each of the individual's competencies may it be known that he is fitted for a particular type of work.

Most persons fall into the right kind of work by accident, Mr. Nathanson stated. Many who are now doing one kind of work well could do another sort better. Many who are doing one sort of work badly suffer the illusion that they could do another kind better, and so compensate for their failure in the first.

Citing many of the early leaders in the automotive industries, many of whom began life in other professions than that of engineering, Mr. Nathanson stressed the loss to the world provided that these men had been forced to continue in a profession which was uncongenial, and made a strong plea for fitting the right man to the right type of job on a really scientific basis.

Because of their specialization, and consequent emphasis on individual competencies, Mr. Nathanson said, engineers are likely to be the most gullible people in the world when it is a question of accepting other forms of knowledge to which the application of scientific method might result in the detection of its essential unsoundness.

The perfect individual represents the perfect cube, he concluded in effect, but it is the magnitude of the cube that counts. This is the problem of individuality.

*"Cubing" the Individual*

THE human being is likened by Yale S. Nathanson to a cube, each face of which represents one of the factors present in the individual temperament. The sum of the action and reaction of these factors is the individual's personality. The perfect individual represents the perfect cube, but it is the magnitude of the cube that counts.

Gasoline Engine Experience May Aid Development of Oil Powerplants

Present complicated construction of compression ignition fuel systems runs into dollars—and dollars win.

By ROBERTSON MATTHEWS

INCREASING interest is shown in the high-speed oil engine. Attempts are being made to have it take from the gasoline engine a larger share of the high-speed engine field. These endeavors range all the way from stationary to aeronautic requirements. This situation raises consideration of what the high-speed oil engine can, so to speak, learn from the gasoline engine situation.

The high-speed oil engine, at the outset, lacks the market enjoyed by the gasoline engine. That market is not only selective and positive in some of its tastes, but is so large that it allows the benefits of great mass production and also of standardization to an extent not possible in a group of smaller and diversified markets. The resources and influences in the path of progress will differ, therefore, for the two types of engine.

Consider the truck and passenger car markets. The latter wants smooth, odorless and clean operation. The oil engine is not remarkable in these respects. The passenger car has provided for its requirements the existing wide system of fuel distribution; and it is able to utilize the service stations on either coast and anywhere in between. A like proportion of trucks need no such provision and station adaptability. The travel range of the truck is not commonly so wide as that of the passenger car. In many cases a fleet of trucks (like that small percentage of passenger cars in taxi service) can have its own service stations and its own grade of fuel.

Some cities happen to have benzol as a by-product from their industries, and it is sold as an ingredient of passenger car fuel. But the characteristics of such fuel are not only within the limits of standard carburetor operation but possess desirable anti-knock properties. Is there any parallel case for the high-speed engine using compression ignition?

Fuel cost is not a highly significant item for the individual private car owner. His fuel consumption has been said to average 500 gal. per year. Hence, devices for improving fuel economy do not appeal to the passenger car maker

except if they mean a reduction in initial cost of machine, that is, a reduction in capital cost. The best carburetor on the market, the product of years of experimentation, can be bought for a price so different from that of a fuel injection system built for individual pump feed to each cylinder as to leave little room for the compression-ignition engine with that type of fuel feed to appeal to the manufacturer as a reducer of first costs. A carburetor and a pump compare somewhat as foundry and toolroom jobs. (It is here taken for granted that the storage battery always will remain an essential piece of automotive equipment and hence remain an item in capital costs.)

To meet the requirement of reduced first cost of fuel system, it would seem, therefore, that not only must a single rail fuel system be provided, with its inherent reduction in pump parts over that of the individual pump for each cylinder, but a decidedly cheap design must be provided for the accompanying operation of fuel injection valves.

The aeronautic engine is not considered here, because it has requirements peculiar to its field of operation, not the least of which is lowest attainable fuel consumption. That the aeronautic oil engine will in time teach the automobile makers a lot about oil engines is probably to be granted in view of past results with the development of gasoline engines.

Granting that a fuel injection system may yet be evolved that shall meet the carburetor favorably on first cost of fuel system, the problem of desirable fuel is to be considered. While it so happens that the compression-ignition engine is the logical development as regards economic conversion of heat into power in an engine where first cost does not count primarily, it is unfortunate that gasoline and such volatile fuels are not suitable for use with compression-ignition operation. High volatility is conducive to a desirably high rate of combustible mixture formation. But at the initial temperatures of compression-ignition combustion, the combustion is over-rapid.

Acceptance of an Otto pressure-volume card in

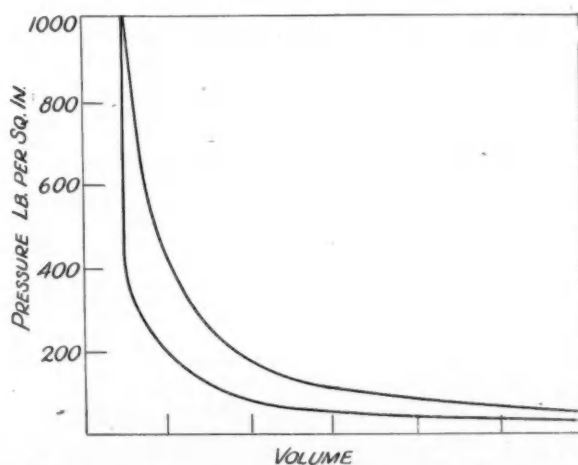


Fig. 1—Pressure-volume diagram for high-speed oil engine

place of the Diesel card familiar with slow-speed compression-ignition engines, is, at present, one of the foundation conditions underlying development of the aeronautic oil engine. But while the use of the Otto cycle instead of the Diesel is, with these high compression ratios, conducive to high fuel economy, the acceptance of this cycle has heretofore been compulsory. The engineer can't—as yet at least—help himself.

Unless the oil engine industry produces some combination of a Watt and Faraday, it is likely that any high-speed engine possessing the operating characteristics of being able to burn its fuel charge part at constant volume and appreciably at constant pressure, and therefore with a moderate maximum pressure, will be prohibitive in price. Solution of the problem arising from shortness of time available for combustion runs up against dollars for complicated construction, and dollars win.

Cost of Low Fuel Economy

The old problem of trying to obtain good fuel economy, high m.e.p. and a desirable maximum combustion pressure all simultaneously at high r.p.m., has lately been attacked by accepting a high maximum pressure. That this is an unwelcome acceptance is evident from a glance at the theoretical card, Fig. 1. A high-speed compression-ignition engine operating with a favorable fuel consumption has no difficulty in reaching a maximum pressure of 1000 lb. per sq. in. Try restraining combustion by later injection so that the diagram may approach a more attractive maximum pressure, and the result will be not an adiabatic expansion line but an approach to an isothermal combustion line, or something even higher, extending down to the time of exhaust valve opening. In short, a couple of hundred pounds can be knocked off the maximum combustion pressure but with an elevation of the combustion line along the toe of the card. The resulting low fuel economy may be prohibitive for an engine having a competitor.

Unfortunately, high maximum pressures do not boost the thermal efficiency and produce a skinny card. They do influence cylinder and friction losses. They are a characteristic of high r.p.m., and for the present consolation must be found in the high cycle-efficiency possible with compression ignition as compared with a carburetor engine, as shown in Fig. 2. The values for this curve are not based on an "air card" exponent but on an exponent more consistent with actual operating substances and therefore giving lower efficiency values for each compression ratio. (Allowing for heat losses within the cylinder of 15 per cent, and mechanical friction losses equivalent to 20 per cent, the fuel consumption per b.h.p. hour would be around 0.39 lb. per hp.-hr. with 13:1 ratio of compression and an approach to adiabatic expansion.)

As a competitor with the carburetor engine the oil engine falls short as regards smoothness, available m.e.p. and adaptability to use light refined, clean-

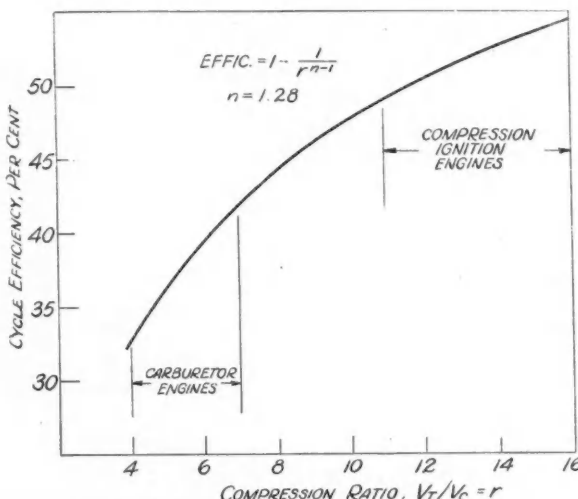


Fig. 2—Dependence of thermal efficiency on compression ratio

burning fuel. For trucks, where operating conditions need not harmonize with finger-tip control, the compression-ignition engine has, however, a chance. A little extra weight per horsepower is not decisive and the high load factor can make the fuel bill significant. But—must the compression-ignition engine take the leavings after the carburetor engine gets its fill? Does the automotive industry indulge in building fuel incinerators or does it attempt to develop both the fuel and the device that uses it? Why not let the big, slow marine and stationary engines be the incinerators for the

liquid fuel industries and go after fuel that in high-speed engines can give desirable peak pressures and encourage thereby more speed and possibly less weight and cost per horsepower?

A New York daily (*The Times*) recently stated that Chrysler had purchased abroad a new engine that will burn a mixture of gasoline and tar. This raises a consideration for those developing high-speed oil engines.

Coal products as engine fuel have a disadvantage compared with petroleum products in that they behave differently in the cylinder and do not ignite so readily. Fuel oils from coal tar have a lower heat value than petroleum oils; their analysis shows less carbon and only about half as much hydrogen, which is said to influence the ignition point. Furthermore, mechanical provisions for controlling the fluidity of the oil are favorable only with large powerplants having continuous operation.

New Fuel Needed

However, it was stated above that gasoline burns too freely for compression-ignition operation; in fact, knock troubles in carburetor engines are a result of uncontrolled rapid combustion. But the handicap of utilizing what for carburetor engines is high compression, has received large and far-reaching attention. In Britain organizations have financed fuel research till now it is claimed by them that they have the best automobile gasoline in the world. Over here large funds have been expended in developing tetra-ethyl lead and equally large amounts spent in getting it before the public.

Production of gasoline from coal is under way abroad and receives considerable comment. But gasoline is not wanted for compression-ignition engine operation. A fuel is wanted that shall be just as suited for compression ignition as is good anti-knock gasoline for spark ignition. With proper incentive, it might not need the large commercial laboratory to find such a desirable fuel in coal by-products or to find a desirable blend with petroleum products. Some lone chemist might find what is wanted.

But with a start by a government organization and cooperation between engine builders and developers of low temperature carbonization, we should arrive at favorable results, not to be expected, probably, if we await petroleum interests to dictate the schedule.

High Speeds Change Road Standards

French engineer analyzes requirements of banking of curves at 12.5, 18.75 and 21.8 m.p.h. Ohio State formula applies to 25 and 35 m.p.h.

WITH the increasing speed of motor traffic the banking of curves to permit their negotiation with safety at considerable speeds becomes of increasing interest. The problem is somewhat similar in one respect to that other problem of road traffic—road lighting—in that more or less conflicting requirements must be met. Curves should be so banked as to permit fast vehicles to negotiate them without the necessity of slacking down materially, and yet they must not be so steeply banked as to endanger slow-moving vehicles. At the present time, where roads are being laid out for really high-speed traffic, it has become the custom to increase the width of the paved section at curves, and make each half of the profile bowl-shaped so that fast vehicles can take the curve near the steeply banked outer edge while slower vehicles hug the inner edge of their particular half of the roadway.

The whole subject was discussed at considerable length in a recent article "The Technique of Banking Curves," by Roger Begard, engineer of the French Department of Public Works, which appeared in *Le Genie Civil*. It appears that a French Ministerial circular issued under date of March 7, 1929, to chief engineers of roads and bridges, reminds them that in case of any major repairs to the curved sections of national roads these sections must always be banked.

M. Begard has used in road construction the formula made use of by railroad construction engineers, viz.:

$$P = \frac{V^2}{9.81 R}$$

where P is the transverse inclination in per cent; V , the speed in meters per second; R , the radius in meters.

If the speed is expressed in feet per second and the radius in feet the equation becomes

$$P = \frac{V^2}{32.16 R}$$

He set speed limits of 20, 30 and 35 km. per hr. for radii of 30, 40 and 50 meters (speeds of 12.5, 18.75 and 21.8 m.p.h. for radii of 100, 130 and 160 ft.), which give banks of 10, 17.5 and 19.1 per cent respectively.

The speeds here figured which seem to be rather low for flat country and are generally exceeded even in mountainous territory.

The direct application of this equation to considerably higher speeds soon leads to inclinations which are simply prohibitive, as may be seen from Fig. 1 herewith. It also leads to considerable elevation of the outer

edge of the road, even if the concave profile is adopted.

The road engineers of the State of Ohio use a uniform transverse inclination of 1 in. per ft.,

except in cases where mixed traffic has to be accommodated, when they use the equation.

$$P_1 = \frac{0.067 V^2}{R}$$

where V represents speed in miles per hour and R is the radius in feet. They usually figure on a maximum speed of 35 m.p.h.

It is customary to combine with the last-mentioned equation the additional-width equation of Voshell, which is as follows:

$$S = 2 (R - \sqrt{R^2 - L^2}) + (35/\sqrt{R})$$

where S is the extra width in feet; R , the radius in feet, and L the space occupied by the vehicle, which is generally taken at 20 ft.

In the case of curves of small radius the use of extra widths is practically indispensable. It will be seen that the formula for banking when applied to speeds of 25 to 35 m.p.h. gives inclinations which are practically prohibitive in the case of slow-speed vehicles, and which are also difficult to obtain if the ordinary methods of (macadam) road construction are employed. It is then assumed that at curves the road consists of two parallel tracks, one for slow, the other for fast traffic. The first is banked to give a neutral speed of about 12 m.p.h., while the second is banked for a neutral speed of about 30 m.p.h.

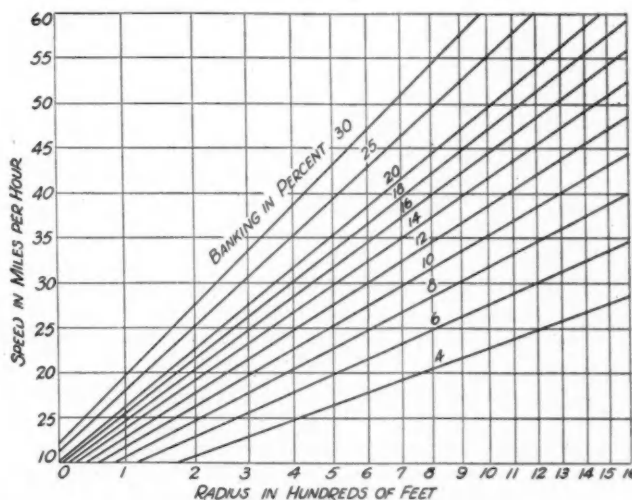


Fig. 1—Chart of bankings and neutral speed for curves

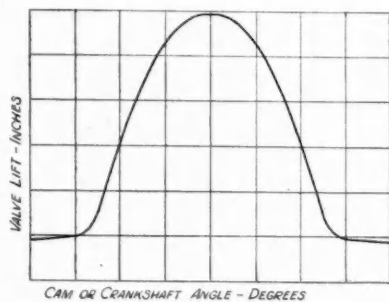


Fig. 1—Valve-lift curve

THE object of this paper is not to show, or discuss, the merits and demerits of different valve mechanisms, but to describe and demonstrate equipment for studying the behavior of any valve gear. The demonstration of any equipment becomes a simpler and easier task if the assemblies under study are faulty, and for this reason the cam and spring combinations have been so selected that the maximum number of valve gear faults will be brought out.

It will be taken for granted, in this discussion, that the valve timing, lift, areas, etc., as laid down by the designer, are all correct. It then becomes the duty of the valve operating mechanism to reproduce these quantities accurately and faithfully at all speeds. The valve gear may have many faults, but all of them result in an inaccurate reproduction of the valve-lift curve. To make a study of such a mechanism, therefore, resolves itself into studying the lift diagram. A lift

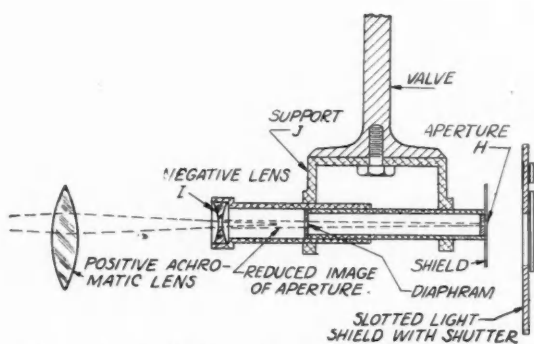


Fig. 2-B—Optical system of valve-lift indicator

diagram is the curve obtained by plotting the valve lift in inches as ordinates against either crank or camshaft angles as abscissas. Fig. 1 shows such a diagram. For this purpose the valve-lift indicator was built. The first requirement of such a machine is that the machine itself must introduce no errors into valve-lift curve reproduction. This means that it must be as rigid as the engine itself, that all the parts to be tested must be reproductions of the design, and that all instrumental errors must be determined by calibration.

Fig. 2-A is a diagrammatic sketch of the valve-lift indicator. The light is at 8, the condenser lens at 9, a small aperture at 11,

Performance of Valve by Specially Designed

*Cam and spring combinations
maximum number of
and analyzed in tests
read before the Cleve*

By FERDINAND
Research Engineer,

an objective lens at 12, and a screen at 15. These parts would project an image of the aperture 11, which moves with the valve.

If, instead of letting the objective project the image directly upon screen 15, it is deflected by means of a plain mirror, 13, set at the proper angle, upon a rotating mirror, 14, the resultant of two motions is projected on the screen. The vertical component is obtained from the motion of the valve, and the horizontal component from the revolving of the mirror 14. This mirror has eight sides and rotates at $\frac{1}{8}$ camshaft speed. The image on screen 15, therefore, will be repeated once for each camshaft revolution, and, owing to the persistence of vision, appears to be continuous and stationary, in the shape of the ordinary valve-lift curve. This image curve can be observed visually for seat bouncing and increased lift; also, any irregularity of the opening and closing lines can be seen. When desired, a photographic film, such as is used in the ordinary portable camera, can be put in place of screen 15, and the curve will be photographed. To photograph suc-

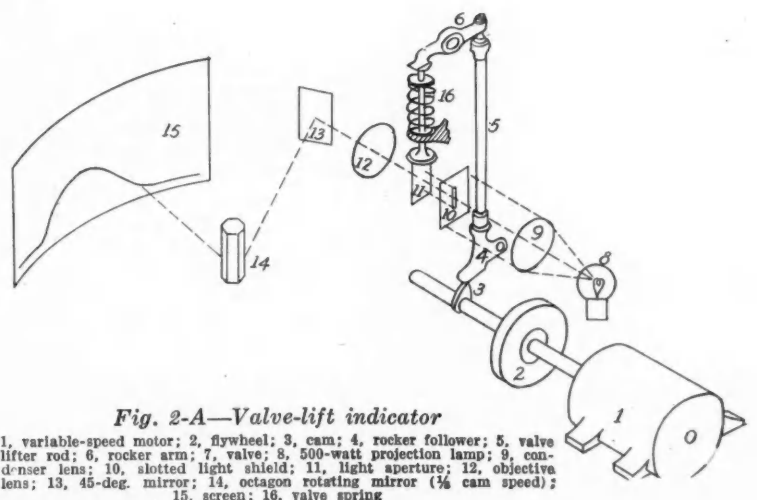


Fig. 2-A—Valve-lift indicator

1, variable-speed motor; 2, flywheel; 3, cam; 4, rocker follower; 5, valve lifter rod; 6, rocker arm; 7, valve; 8, 500-watt projection lamp; 9, condenser lens; 10, slotted light shield; 11, light aperture; 12, objective lens; 13, 45-deg. mirror; 14, octagon rotating mirror ($\frac{1}{8}$ cam speed); 15, screen; 16, valve spring

Mechanisms is Recorded Line of Instruments

*nations possessing a
faults were selected
described in paper
land Section, S.A.E.*

JEHLE

White Motor Co.

cessfully, it was necessary that a mechanism be developed for holding the shutter open while only one projection of the valve lift passes across the film.

The one trouble with this device was that the aperture 11 was magnified, as well as the motion of the valve, resulting in a heavy record line on the screen. To overcome this difficulty, we developed the apparatus shown in Fig. 2-B to replace the plain aperture. This consists of an aperture, *H*, of about 1/32 in., and a strong negative lens, *I*, some distance away from it, both

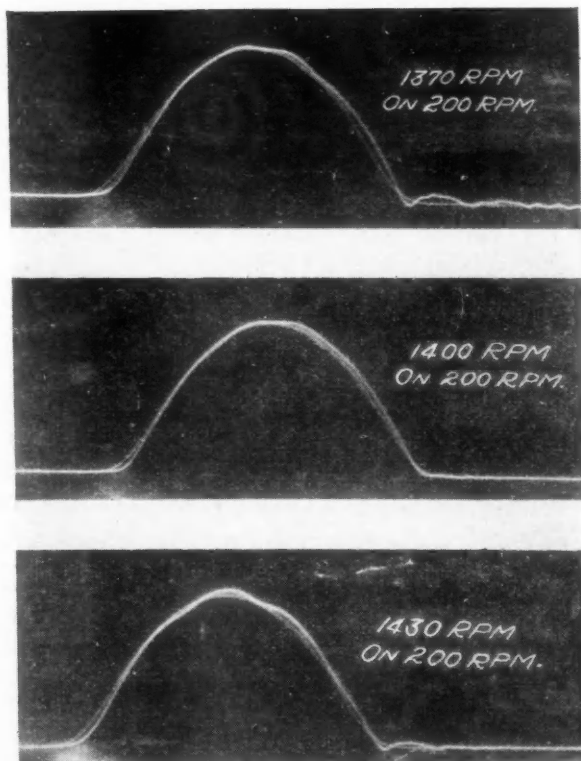


Fig. 4—High-speed valve-lift diagrams superposed on low-speed diagram

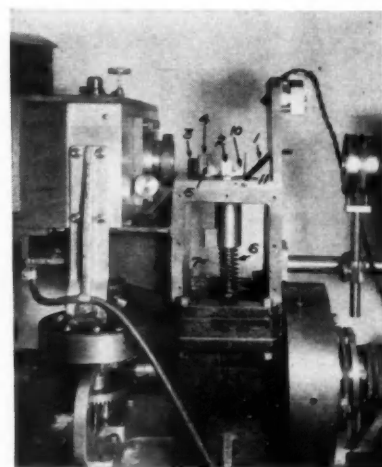


Fig. 3—Valve-lift indicator devised for White Motor tests. (see Fig. 2-A)

mounted in a support, *J*, attached to the valve. The result is that a reduced image of the aperture is used to draw the lift curve on the screen, and very thin record lines are possible. The weight of the valve must be reduced by an amount equal to the weight of the lens and its support, which must be kept at the minimum. Fig. 3 shows this valve-lift indicator complete, the parts being lettered to correspond with Fig. 2.

In laboratory use this apparatus produces a valve-lift diagram only about 2 in. high, and several changes in the optical system are made when this diagram is to be projected on a screen.

Fig. 4 shows three records; one at 1370 camshaft r.p.m., another at 1400, and the lower one at 1430 r.p.m., each superimposed on a diagram taken at 200 camshaft r.p.m. The diagram taken at the low speed, that is 200 r.p.m., is a correct lift curve. The upper diagram, that at 1370 r.p.m., shows bad bounces. Increasing the speed 30 revolutions shows an almost perfect diagram, while increasing it 30 more revolutions again shows bounces. The speeds of 1370 and 1430 must, therefore, be in a spring period.

Valve-lift diagrams taken at 780, 1000 and 1200 r.p.m., of the camshaft, which are within the limits of speed for which the engine was designed, showed no serious departure from the true curve, and bounces on closing were absent.

The question naturally arises, What causes spring vibrations? The spring, of course, has a certain frequency, that is, if it is struck with a soft hammer, or bowed with a violin bow, it will emit a tone of a certain pitch. If something having the same frequency is brought reasonably close to this spring, it will start vibrating sympathetically. It should be noted that, before one body can be set into vibration sympathetically by another, their frequencies must bear a ratio to each other of one to one. No other ratio will do.

Something in the engine must, therefore, have the same frequency as that of the springs. Valve springs, as a rule, have frequencies of 10,000 per min., and up, and certainly there is nothing about an engine that rotates at such a speed, particularly not the camshaft. Any periodic motion, however, such a valve lift can be resolved into a series of harmonic components. The components are sine curves, and if their ordinates are added, the ordinates of the original valve-lift curve will result. If a spring having a frequency of 10,000 per

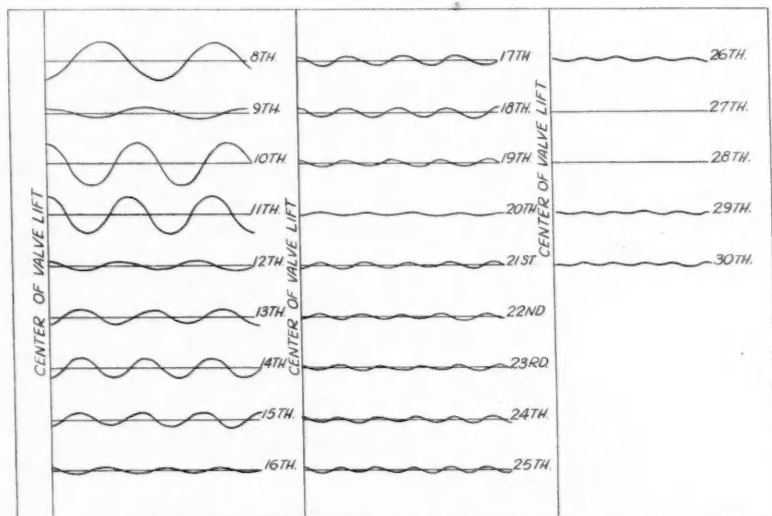


Fig. 5—Harmonics of valve-lift curve

min. is used with a cam having a 10th harmonic, the spring will be set into vibration at 1000 r.p.m. of the camshaft.

Fig. 5 shows the harmonic components above the 8th, and up to and including the 30th, of a lift curve. All the harmonics are not present to the same degree. The 8th is strong, the 9th weaker, the 10th is stronger, the 12th is weak, while the 11th and 13th are strong; the 27th and 28th are missing. The stronger the harmonic, the greater will be the vibration of the spring at a speed equal to the spring frequency divided by the harmonic number.

To make an experimental check of this harmonic theory applied to valve spring vibration, an indicating attachment was fitted to the valve-lift indicator.

Fig. 6 is a diagram of the valve-spring vibration indicator. By means of three small mirrors, 1, 2 and 3, a beam of light from the projection lamp is led around the valve, through a small slot, 4, which is the object to be projected, and into the objective lens. As in the valve-lift indicator, the image of this slot is focused on the screen after being reflected by a 45-deg. flat mirror and an octagonal rotating mirror. For optical reasons, this image must be offset from the image of the aperture which makes the record of the valve motion, and correction made accordingly. In front of this slot, the width of which is adjustable, is placed a small shutter, 5, which moves up and down with one of the coils of the valve spring, 6, and thereby changes the length of the slot and of the image on the screen accordingly. The shutter is attached to the spring coil by means of a piece of stiff wire, 7, soldered to the coil and guided through a small hole, 8. The valve lens, 9, and its support, 10, are the same as in Figs. 3 and 4, and 11 is the valve. The combination of the change in image length with the motion across the screen produced by the ro-

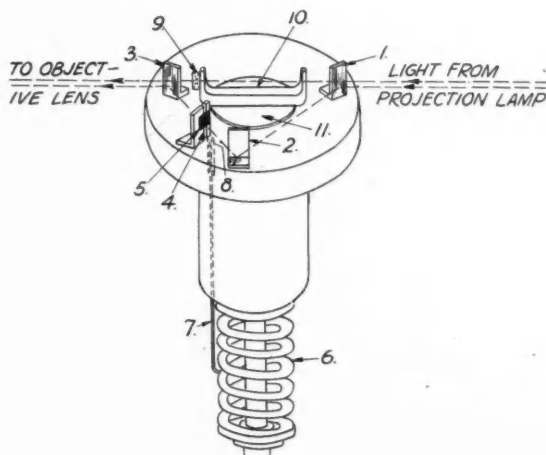


Fig. 6—Spring-vibration indicator

1, mirror; 2, adjustable slot; 3, light shutter; 4, valve spring; 5, shutter wire; 6, guide hole; 7, valve lens support; 8, valve lens support with aperture; 9, valve

tating mirror throws an enlarged picture of the coil motion on the screen. Since this picture is repeated by every face of the octagonal mirror, the persistence of vision makes it appear stationary, and the vibration can be studied carefully. For a permanent record, this picture is thrown on a sensitized film, as in the valve-lift indicator.

Fig. 7 is a photograph of the spring vibration indicator. All of the letters in this figure apply to the same parts as in the previous one.

The experimental work so far has checked perfectly with the harmonic theory. There is one more check that could be applied. If the valve-lift curve had no harmonic, then a valve spring would not vibrate until the camshaft r.p.m. equaled the valve-spring frequency. Such a cam would have to produce a simple harmonic motion. A cam of this description was constructed; but of course, it is not possible to run at speeds equal to the valve spring frequency. The best that could be done was to run up to as high a speed as the engine and the rest of the apparatus permitted.

Fig. 8 shows diagrams taken at 250, 1000 and 1850 r.p.m. of the camshaft, and up to and including that speed there is not the slightest indication of a spring vibration.

After having seen all the bad things a valve mechanism can do, particularly in the way of running in valve-spring periods, it will also be of interest to look at a photograph of some records of the performance

of a good spring and cam combination.

Fig. 9 shows both the lift curve and vibration record

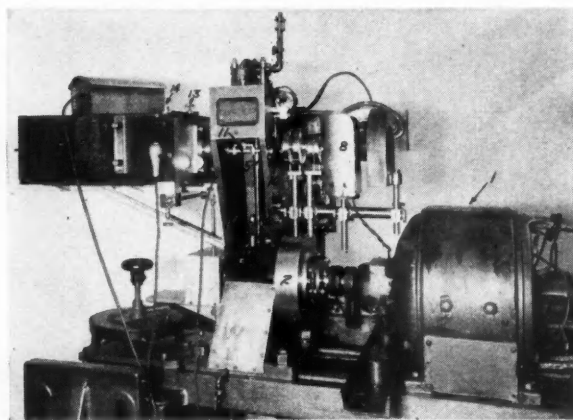


Fig. 7—Photograph of spring-vibration indicator

of a spring and cam combination at speeds up to 1560 r.p.m. of the cam. Of course, a spring cannot be prevented from starting to vibrate, but if the vibration does not continue during the entire cycle and is not in step with the new vibration that starts, no damage has been done. At a speed of 1240 r.p.m., the spring vibration has been absolutely killed before the valve again opens. At 1280, practically the same thing is true. At 1560, that is at an engine speed of 3120 r.p.m., the spring wave is just barely visible at the beginning of valve opening. This latest speed, of course, is beyond that in which we are interested. It will be noted that the valve-lift curve is smooth in all these diagrams.

There is one more major trouble which can be encountered with a valve mechanism and that is the change in tappet clearance. All lift diagrams are laid out for a certain tappet clearance. If this clearance changes, the diagram will change. If the clearance is increased a great amount, the tappet will come into contact with the valve stem at a velocity much higher than was intended, and noise and wear will result. Should the clearance decrease a great amount, the valve may even be kept off its seat entirely, which certainly will result in valve burning and in a reduction in power, due to leakage. It is to be expected that the tappet clearance will vary as the engine speed and load conditions vary. As the engine gets hot, all of the parts do not reach the same temperature at the same time, and, therefore, do not expand equally. It is very difficult to predict just how this clearance will vary, and to make a study of it, a special instrument called a valve-clearance indicator was designed to measure tappet clearance accurately on an engine while running.

Fig. 10 is a diagrammatic sketch of this instrument in use, as well as a more or less detailed drawing of the

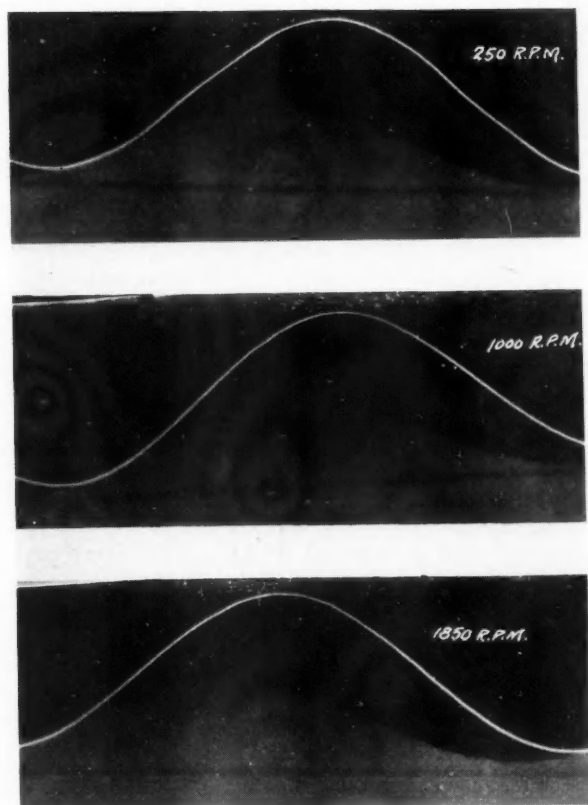


Fig. 8—Diagrams taken with spring-vibration indicator at various speeds

Fig. 11—The valve-clearance indicator used in the tests made by the White Motor Co.

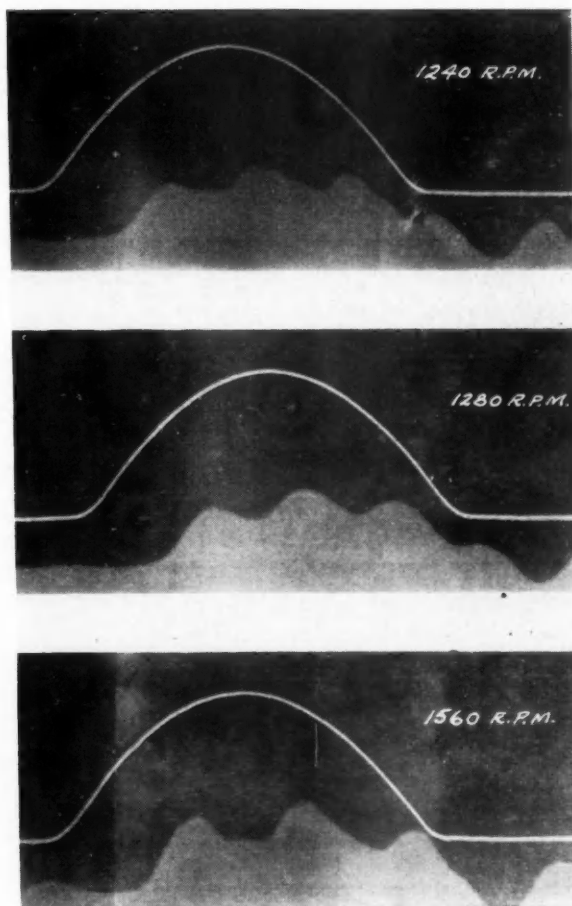
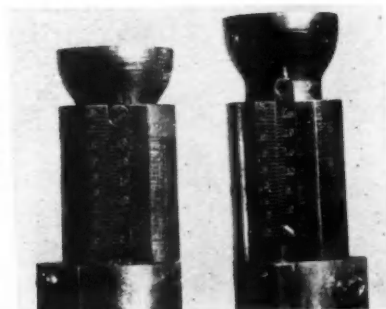


Fig. 9—Lift curves and vibration records of cam at various speeds

important parts. A section of the valve rod has been cut out and the valve-clearance indicator inserted in its place. In the enlarged section, the construction of this indicator is shown. A is a hollow member with a keyway cut through it; B fits snugly into A, and the key, which is attached to B, fits nicely into the keyway of A. On the flat portion of A, adjacent to the keyway, a scale is engraved; while on the key, which is attached to B, a vernier is engraved. When the rod is inserted in the engine, a weak spring takes up the entire tappet clearance. The amount of this clearance is shown in Fig. 10. As the valve opens, the light spring is compressed, allowing A and B to contact and raise the valve. As soon as the follower is again on the base circle, the light spring takes up the clearance.

If the clearance does not vary, the reading of the

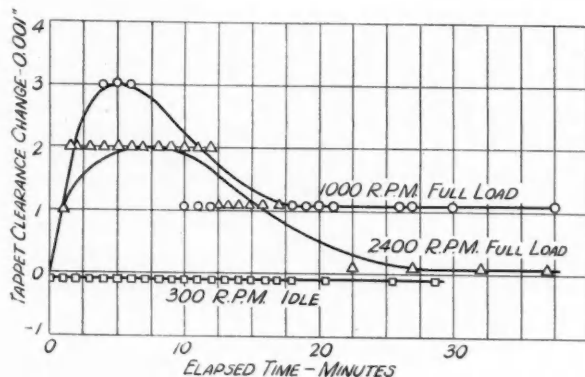


Fig. 12—Change of inlet valve clearance with time (after starting)

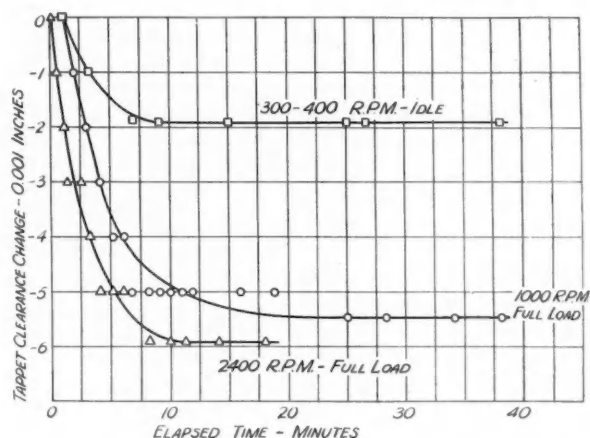


Fig. 13—Change of exhaust valve clearance with time (after starting)

vernier will always be the same; but if it varies, the reading will change. The change in reading is the change in tappet clearance. The right-hand side of Fig. 10 shows the installation of the optical equipment for reading it. Light from a source, such as projection lamp, is thrown on the polished surfaces of the vernier and scale, and reflected from them into a telescope, which in turn is focused on a screen. An enlarged image of the vernier and scale is, therefore, visible on the screen. The reading of this instrument with the engine running is fairly easy.

The engine is its own stroboscope because the valve is on its seat twice as long as it is off its seat. At any speed above, say, 200 or 300 r.p.m., the image on the screen appears to stand still and can be quite easily read. The effect of load, water temperature, and whatnot, on

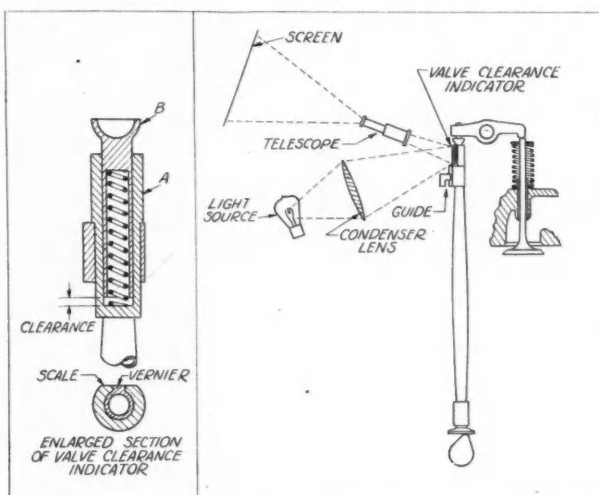


Fig. 10—Valve-clearance indicator in use

tappet clearance can thus be very easily studied at any engine speed. This particular instrument has been used at engine speeds from 400, up to and including 2400 r.p.m. In fact, the higher the speed, the easier it becomes to read because the image will be more steady.

Fig. 11 is an enlarged photograph of the valve-clearance indicator. The two views in the figure show the vernier member in different positions, thus illustrating the working of the key. One

very important thing must not be overlooked, the scale and the vernier must have a mirror polish.

Fig. 12 shows the variations of clearance (intake) at 300 r.p.m., idle; at 1000 r.p.m., full load; and 2400 r.p.m. full load.

Fig. 13 shows the variations of the tappet clearance of an exhaust valve with clearance time.

REPERCUSSION—A New Export Factor

(Continued from page 645)

Industries of all kinds will feel then the need of growing into larger units and expanding their sales into foreign lands where 92 per cent of the world's population resides. Our population is about 2 per cent of the world's total. Automobile executives generally believe that neither industry nor agriculture will wish to have tariff walls prevent them from prospering under a policy which succeeds by reducing prices to consumers, and by creating large scale production with small profits.

Labor will have realized that competitive ability has nothing to do with wages, but with the cost of labor per unit of article. It will have seen that machines help to get down this per unit cost and thereby make increasing quantities of the articles accessible to the purchasing

of each of the masses. When the knowledge has spread that the masses of the world determine prosperity as they are aided to buy increasing quantities of goods by constant lowering of prices without tariff inflation, then will the United States tariff be subject to economic principles.

Then very likely will reasonableness in tariff laws be advocated. There will probably continue to be protective tariffs, but they will be protective of exports in the light of needs of a modern nation of world importance.

Such a change in policy cannot come too soon. It is needed now in the automobile industry. Such an action would offset agitations abroad for reprisals against American major products, and automobiles in particular.

Just Among Ourselves

Victories in Industry Built on Compromise

SOMEWHERE we read the statement recently that "There are few knock-outs in economic battles. They end in compromise with both fighters on their feet."

There is much of truth in that statement. Certainly, a company is much safer to make plans which allow for its success in case it fails to demolish all important competition, than to hazard all on the chance of towering over the field in solitary economic glory.

* * *

"Belittlin'" Won't Regain Loss in Parts Volume

ONE thing we predicted at the beginning of the year is coming true, if nothing else does. We prophesied that car makers would really begin to scrutinize their parts and service divisions as profit-making possibilities more sharply than ever before. They are doing so.

And in the process they are being impressed with certain existing conditions which have been present for a long while, but of which they haven't been very acutely conscious.

The day passed several years ago, of course, when a car manufacturer could be so naive as to announce that a decline of several hundred thousand dollars in his parts business must be due to the smaller amount of service needed by his cars in owners' hands. Nevertheless, there are still a great many things about parts merchandising and distribution that the average car company seems to be unaware of still.

The great independent parts business which has been built up during the last two decades has reached its present size and importance chiefly because it renders a sound, useful economic

service and gives full value received for every dollar paid to it by the public. No amount of calling of names or "always belittlin'" will change that economic fact.

The car manufacturer who hopes to recover lost ground or gain new ground in parts sales volume by any means other than those of merchandising, providing greater accessibility, greater dealer profit and better price to the consumer than does competition is hoping vainly.

* * *

No "Divine Right" Theory Works in Competition

THE service which independent parts makers, distributing through jobbers, have rendered in making service generally available and increasing car sales possible is too frequently lost to sight. Had parts distribution during the last 20 years been confined to sale through car dealer channels exclusively—and until about three years ago practically all car makers so confined distribution of their own original parts—it is safe to say that there wouldn't be anything like 26,000,000 motor vehicles running around the roads of this country today.

Parts availability through jobber distribution has been a vital factor in making possible the vast total of motor car ownership in the United States.

All of this is an old song, to be sure, but it's good to sing the old ones every now and then even though they be not favorites.

The only point we hope to make is this: The independent parts maker has earned by service, by effort and by energy, whatever measure of success he has won in the field of replacement parts manufacture and distribution. The car manufacturer has earned whatever measure of success he has had in this field

in the same way; and whatever further success he may hope to achieve can come permanently only through the same means. No "divine right" theory will work, whatever arguments may be advanced for its justice.

* * *

Trials at Daytona Include Some Neurasthenic Items

LOOKS as though Major Seagrave's fastest mile record were going to stand for a little while longer at any rate without being seriously assaulted. The Kay Don attacks were always frustrated by one thing or another, bad weather or beach conditions being the chief offenders.

Daytona was a town of gossip, charges and counter-charges and frayed nerves for several weeks during the time Don was running or waiting for a chance to run. The last of the individual versions of what went on or failed to go on during those hectic weeks probably won't be heard for many months.

We weren't there and we have no opinion, except this one—that a designer and driver striving for a new mile record these days gets plenty of things presented to worry about besides designing and driving the automobile.

* * *

France Shows Us Tariffs Which Are Tariffs

WELL, the French finally went and did it. They slapped on to automobiles some tariffs which are tariffs. The English situation turned out a little better—according to how you look at it. At any rate the Snowdenites didn't make things any worse for automobile importers. Looks as though automotive men were going to be more interested in foreign tariffs in the future than in the past.—N. G. S.

Research Facilities Improved at

Life tests of the company's products carried on in a manner designed to accelerate failure

DURING the past few weeks the engineering department of the AC Spark Plug Co. has been moving into its new laboratories, which not only provide better facilities for research and development work, but also release considerable floor space in the main factory buildings for AC manufacturing activities—gasoline gages and mica spark plugs.

The new three-story engineering building comprises 73,000 sq. ft. of floor space, with maintenance department on stores, and clay preparation department on the

is concerned, Harlow H. Curtice, president of AC, is authority for the statement that all of this company's 12 distinct products, with the exception of the centrifugal air cleaner, were developed in the AC engineering department.

Improvement in existing products is largely brought about by means of minor changes in design of materials and subsequent life tests. Life tests are also carried on in a manner designed to accelerate failure if it should occur, on samples taken directly and at random from production each month. In this manner there is further insurance, in addition to production inspection checks, that the various products are being maintained at standard quality. In the case of spark plugs, such selections are made daily rather than monthly, due to the extremely large quantities produced and the need for more accurate sampling for assurance of satisfactory material control.

Spark plug performance check tests are carried on largely in the dynamometer room, using actual produc-



Fig. 1—A variable compression engine, with quick removable head, and a three-element oscillograph attachment is used in testing plugs at the AC Spark Plug plant

first floor, experimental machine shop, testing rooms and ceramic laboratory on the second, and offices, drafting rooms, experimental spark plug, chemical and physical laboratories on the third.

Engineering work at the AC Spark Plug plant divides itself into three general classifications:

1. Research and development of new products
2. Improvement in existing products
3. Establishment of specifications, etc., which will insure the continuance of quality during production.

Each product manufactured, whether tile, instruments or spark plugs, etc., is, as far as engineering is concerned, directly controlled by a single engineer, the administration of engineering department activities being largely through committee action of the various engineers in charge of their own departments.

As far as the first classification of engineering work

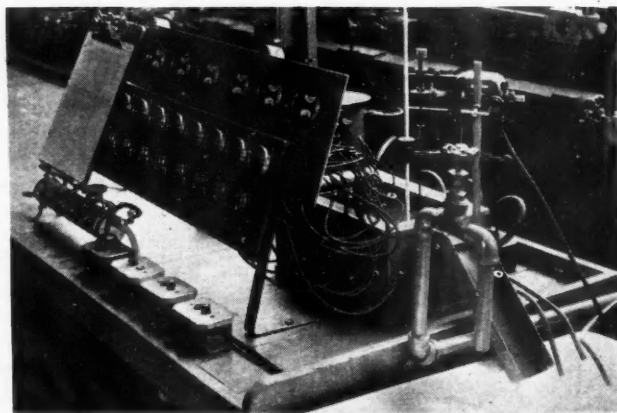


Fig. 3—Panel of instruments employed for accelerated life test of dash thermometers

New AC Spark Plug Laboratories

tion engines. The determination of correct spark plug sizes and designs for new engines is also frequently carried on here, although it is the more general practice in this respect to supply manufacturers with a definite range of spark plugs from which the best type can then be selected in the motor car manufacturer's own laboratory. The AC plugs, however, are checked and tested by the AC system in any case.

In addition to actual operating tests, spark plugs are also checked for fouling resistance, efficiency, effect of different types of gasoline, compression ratio, position in the combustion chamber, chamber design, etc., on specially built engines in which the compression ratio, combustion chamber shape and spark plug location can readily be changed. The equipment of this quick removable head type variable compression engine includes a three-element oscillograph, shown in Fig. 1, as well as other charts recording temperatures, etc.

There is a wide variety of test equipment for speedometers in the AC laboratory. Life test installations are designed so that speedometers can either be run at constant speed (100 m.p.h. or at a definitely determined cycle of speeds mechanically timed to stop about three times per minute to provide a basis of comparison from day to day and month to month. This particular installation, like all instrument life test equipment, is provided with a means to supply considerable vibration. The device consists of a double



Fig. 2—Rotary converter installation used to calibrate AC speedometers at various fixed speeds

eccentric, one within the other, so as to enable adjustment of the total eccentricity, the unit driven by a belt from a synchronous motor. The mass of the eccentrics themselves, mounted on the back of the test panel, is sufficient to produce almost any amount of desired vibration within reason.

Speedometers are further checked also for calibration and temperature correction. Fig. 2 shows the installation used for the former. It consists of a rotary converter, the speed of which is controlled by an electrically driven tuning fork, and provided with a set of several reduction gears on the same spindle to enable calibrations at various fixed speeds.

The tuning fork arrangement gives an exceptionally accurate and uniform speed. The converter is driven from the regular 110 volt d.c. supply, furnishing a.c. to a lamp, or a bank of lamps, through a transformer and set of contacts on the tuning fork. Thus the converter furnishes mechanical load to drive the calibrator and electrical load to the lamp, the latter acting as ballast. With the converter running at 1800 r.p.m. the tuning fork vibrates at a frequency of 60 cycles per sec. The contacts of the fork that are in series with the light, close each half-cycle on the decreasing side of the voltage wave, and open approximately as the voltage crosses zero. Hence, if the converter tends to speed up due to a change in the mechanical load, etc., the contacts, closing at a higher point on the voltage wave, deliver more wattage to the light, thus slowing down the converter. This corrects the speed 120 times per second. When the converter and light are in synchronism the light appears steady, but if they are not, the lamp flickers and the operator is thus immediately apprised of that fact. With the apparatus working correctly, the load on the generator may be varied as much as 50 per cent without throwing it out of synchronism, or the d.c. voltage may fluctuate by about 10 per cent.

To check the effect of temperatures on speedometer readings, they are driven at constant speeds within a chamber provided with a glass front, and in which the temperature can be varied at will and quickly adjusted



Fig. 4—The efficiency of oil filters is proven in a battery of tanks and pumps at the AC laboratory

by means of sensitive thermostats. It is not generally appreciated that without temperature control provision in a speedometer, readings may vary as much as 18 to 20 m.p.h. from zero to 120 deg. Fahr. Since such temperature control is generally provided by means of a nickel alloy shunt in the speedometer, which has to be carefully controlled both as to composition and dimensions, this test also provides a material control check for production runs.

An interesting installation similar in principle of operation to that of speedometer life tests with definitely varied speed cycle, is also employed for the accelerated life testing of dash thermometers or thermo gages. As shown in Fig. 3, the instruments are mounted on a flexibly "anchored" panel. The latter is fitted at the rear with the above-described vibration producing motor-driven eccentric. The bulbs are immersed in a tank of water, the temperature of which is varied from about 60 deg. to 212 deg. Fahr. every half hour. The water tank is connected to the city water supply system through a solenoid operated valve and contains three 600-watt electric heaters. The heaters and solenoid are connected in parallel to the a.c. supply through a mechanical timer as used in flashing electric signs, which turns the current on for twenty-five minutes and off for five minutes. When the current is on, the water valve is closed and the heaters bring the water in the tank up to boiling. Then the current is switched off automatically, and the valve is opened, permitting cold water to flush through the tank for five minutes, thoroughly cooling it.

An interesting test has also been devised for checking the efficiency of oil filters, not only those new in design, but also those taken at random from production. For this test, the oil filters are mounted on racks above individual oil tanks and pumps, as shown in Fig. 4. Used oil from cars not filter equipped is placed in the

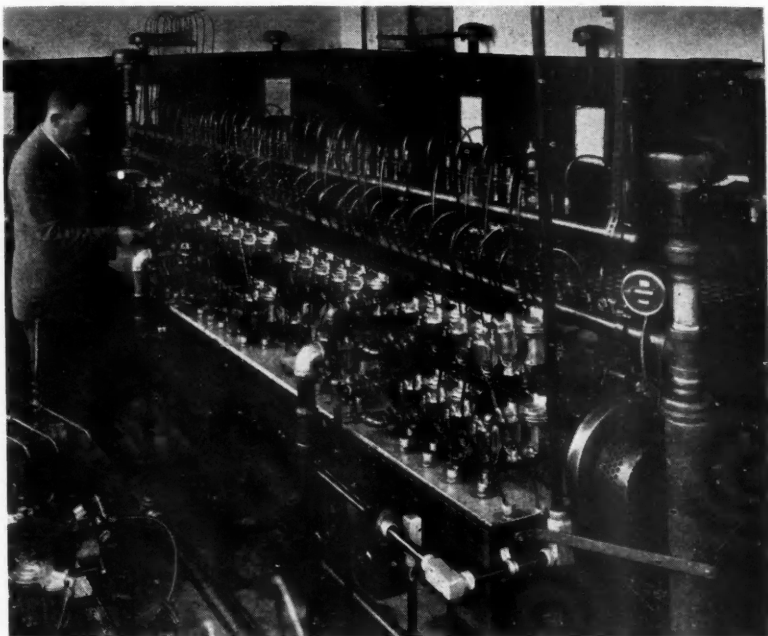


Fig. 5—Some hundreds of fuel pumps are constantly under life tests at the AC plant

tanks and more added at regular intervals. A proportion of this oil is circulated by the pump through the filter, as in actual service. Samples of the used oil being added to the supply tanks are checked for solids by centrifuging with precipitation naphtha. Samples taken from the supply tank are periodically centrifuged for solids in the same manner. Thus by knowing the percentage of solids in the added oil and in the oil being removed the efficiency of the filter can be calculated over any time period. Also the total amount of solids caught by the filter up to any stage until completely clogged is given. The amount of clogging is readily determinable by means of pressure gage readings on the pressure side of the filter.

Determination of the efficiency of air filters also is carried on periodically. Air cleaners are mounted in a hood, and air is sucked through the cleaner by a large vacuum pump through a storage tank and calibrated metering orifice. Interposed between the pump and the air cleaner is a fabric screen to remove any such particles of dust which the cleaner failed to remove from the air stream. Dust of special character, such as Fullers' earth, is fed into the air stream by a rotating brush and plunger feed, so as to maintain a relatively constant proportion of air and foreign matter. Weighing the fabric screen gives a quick determination of air cleaner efficiency over any period of time. This method applies particularly to the oil-wetted type of cleaner, although adaptation of the same principles of testing have been provided for other types of cleaners made by the company.

Fig. 5 gives an indication of the extent to which fuel pumps are subjected to life tests by AC. Some hundreds of pumps are under continuous life tests. Fig. 6 shows the cold box used for life and performance testing of fuel pumps at temperatures ranging to 20 deg. below zero.

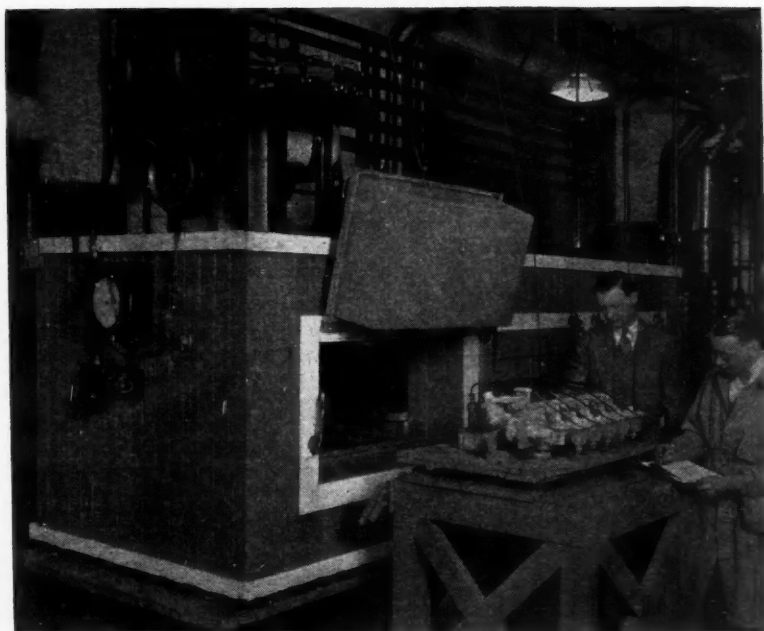


Fig. 6—Life and performance tests of fuel pumps are made in a cold box

THE FORUM

Peugeot and Citroen Favor French Tariff

Editor, AUTOMOTIVE INDUSTRIES:

In your issue of March 1, 1930, your leading article by A. B. Crofoot on the European tariff contains a very important statement which is entirely wrong, being absolutely in contradiction with reports I made to some American firms which I represent, and which may cause very great prejudice in the minds of those American firms.

In the story you mention that Citroen and Peugeot would be affected by the increase of duties and were against the new (French) tariff and that this group has appeared before the Tariff Committee and protested against the increased duty.

I can absolutely guarantee that Mr. Citroen and Mr. Peugeot are entirely in favor of the new tariff and that Mr. Citroen, before the tariff committee, declared himself in favor of the new tariff and very strongly supported it.

Mr. Peugeot has also declared himself in favor of the new tariff.

Mr. Citroen actually declared that he had purchased American parts while reorganizing his factories, but that in the future he did not intend to make such large purchases.

It is true that a group of French manufacturers has appeared before the tariff committee of the Chamber of Deputies and protested; but this group was under my personal leadership and the report was prepared by myself; as I have explained the situation to some American firms, your wrong statement on this point might prejudice me, hence I desire the rectification of your statement.

More Benefit to Citroen

If you are interested in the situation, I might mention for your own information that Mr. Citroen would derive much more benefit from high protection in France than he would suffer from the increased duty on some parts he might still desire to purchase.

I might add that both Mr. Citroen and Mr. Renault have used all their influence to push this new law through and that the law will almost go through in spite of the opposition of the group of small French manufacturers which I lead, and of the French representatives of Ford, General Motors, etc.

On the 20th of March, 1930, the tariff committee actually voted two new laws, without any alteration for cars and with only a reduction on motors (this reduction still leaving an increase of more than 100 per cent on the actual duties.)

We have tried to get opposition from the Foreign Affairs Committee of the Chamber of Deputies but without result. The Trade Committee of the Chamber of Deputies has taken the matter in hand.

After passing the Chamber of Deputies, the fight will be carried on in front of various committees of the Senate, but the very great influence of Messrs. Renault

and Citroen and also the fact that this law was not proposed by individual congressmen, but by the Government itself, compels us to rather a pessimist outlook.

LUCIEN A. BOLLACK.

Paris, France.

Chassis Spring Clearance

Editor, AUTOMOTIVE INDUSTRIES:

In your articles on pages 470-1-2, March 22 *Automotive Industries*, covering Mr. Watson's paper recently given before the Society of Automotive Engineers, we notice an erroneous statement, or at any rate, a misleading one.

On page 472, first column, line 31, your article reads, "when subjected to their normal load." This should have read:—

"During the discussion Mr. Watson was asked what he considered a suitable clearance under the springs of a passenger car *when standing without passenger load*, and he gave 6 to 7 in. for the rear springs and 4 to 4½ in. for the front (absolute clearance over spring bumpers). In one case, etc."

JOHN WARREN WATSON CO.

Car Speed in Tests

Editor, AUTOMOTIVE INDUSTRIES:

I am much interested in Oscar Stromborg's letter appearing in "The Forum" in the March 22 issue of *Automotive Industries*, but do not believe that the Ford motor referred to was accidentally manufactured different from other Ford motors. Rather, the probability is, the results obtained are due to unusual operating conditions. There is one condition of operation that is not mentioned and that is—at what speed was the car usually driven? I would be much obliged to you if you would obtain this information.

HENRY F. ROBBINS.

Crankcase Drain-Cocks

Editor, AUTOMOTIVE INDUSTRIES:

Referring to your discussion of the letter "Developments in Design" on page 483 of the March 22 issue, the drain cocks were removed because of the trouble caused by their breaking off with the result that oil was lost from the machine. It seems that nearly 50 per cent of the cars equipped lost the oil from the cock being broken off. In other cases the cocks were accidentally opened.

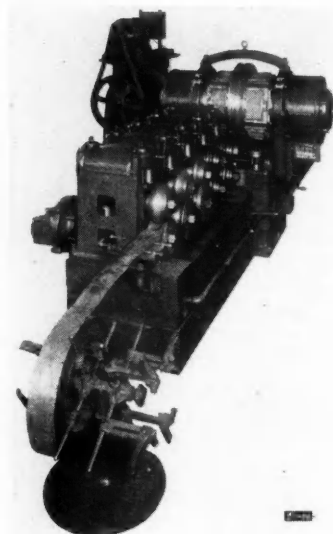
C. G. WILLIAMS.

NEW DEVELOPMENTS—AUTOMOTIVE

DC WELDING UNIT

AN automatic welding unit said to produce smooth uniform welds in formed tubing is announced by the American Electric Fusion Corp., Chicago, Ill. This unit instead of utilizing alternating current for welding uses it only for driving two 35 hp. motors directly connected to an Acyclic Generator generating approximately 2½ volts, and capable of delivering currents up to 20,000 amp. The generator is arranged to deliver welding current directly to circular bus bars that surround the stator, the welding rings being attached to these circular bus bars. Thus, while the rotor of the generator rotates at a high rate of speed within the generator frame, the frame itself rotates slowly over the seam of the tube as it passes beneath the generator. On preliminary trials, speeds as high as 200 ft. per minute were obtained readily.

The nature of the current being non-fluctuating, the welding temperature is likewise non-fluctuating, producing a smooth, continuous weld of parent metal strength. This use of DC current is said to be entirely new in electric welding.



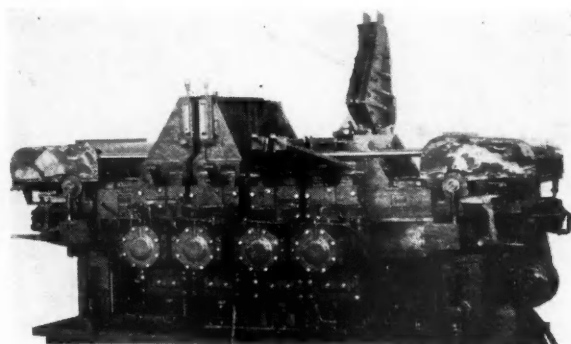
American DC welding unit.

METAL TRUNK WELDER

WHAT is said to be the first high production trunk welder is announced by the Taylor-Winfield Corp., Warren, Ohio. The machine consists of two separate welding machines mounted on one base and designed to act in unison. They are air clamping throughout by toggle action and each machine is motor-driven by silent chain and suitable gears. The upsetting is accomplished by two identical cams actuating the two rollers mounted on the slide.

The welding cycle is as follows: The two end stampings are dropped into aligning fixtures and the central piece is placed in position. The four clamping arms are brought down, the latches thrown into position and the air valves turned

on, thus clamping all four arms at either end. Both levers on the end of the machine are tripped and the automatic flashing mechanism is started. When the flashing and upsetting is complete the arms are released, the latches dropped down and the arms swing up permitting the trunk to be removed. A turn of an air cylinder valve returns



Taylor-Winfield production trunk welder

both slides to the starting position ready for re-loading. Production rate is said to be from 60 to 100 trunks per hour.

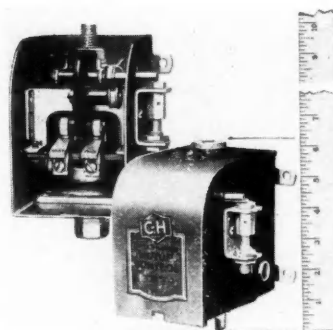
These machines are powered with two 250 KVA continuous duty welding transformers. Dies are of aluminum-bronze. The terminal castings are water-cooled throughout. Total weight is approximately 11 tons.

PRESSURE REGULATOR

A NEW single-pole pressure regulator, Bulletin 10006, exceptionally small in size, is announced by Cutler-Hammer, Inc., Milwaukee,

Wis. This new device can be used as a starting switch for motors up to 1 hp., 230 volts, AC or DC, or as a pilot switch in the control circuit of automatic starters for larger motors. The regulator closes the circuit at low pressure and opens the circuit at high pressure.

It can be adjusted



Bulletin 10006 pressure regulator offered by Cutler-Hammer, Inc.

to open the circuit at any pressure from 30 to 200 lb.

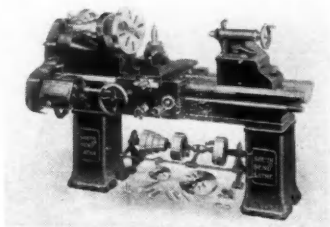
PARTS, ACCESSORIES AND PRODUCTION TOOLS

Applications range over a wide field; it can be used for maintaining pressure on systems containing water, air, gas and other similar fluids. For air compressor service, a small unloader device at the side of the case removes back pressure.

SOUTH BEND LATHE

A NEW lathe designed for light cuts on work of large diameter has been added by the South Bend Lathe Works, South Bend, Ind. This is their regular 16-in. lathe fitted with raising blocks to increase the swing from 16¼ in. to 24¼ in. over the bed. It is also provided with automatic cross and longitudinal feeds and is especially built for the cutting of screw threads. The raising blocks are firmly fitted under the headstock, tailstock and compound rest, the compound rest raising block being graduated on the base so that the tool can be fed to the work at any angle desired.

By using a special turning tool, flywheels 24 in. in diameter can be machined on its face. A roll 16 in. in diameter can be machined between centers for its entire length as a roll of that size will swing over the saddle. This lathe may be fitted with lathe chucks, drill chucks and other attachments which make possible a great variety of work. It can be supplied with countershaft drive or silent chain motor drive as desired, and is available in any length bed from 6 to 12 ft.



South Bend 16-24 large swing lathe

"IDEAL" SPEED LATHE

FINISHING and polishing small parts is said to be readily accomplished on the new "Ideal" speed lathe recently placed on the market by the Schauer Machine Co., Cincinnati, Ohio. The construction of the lathe embodies a two-speed, totally inclosed dustproof motor; automatic brake, ball bearings and an extension in the motor spindle to take extra long rod stock. High or low speeds are selected by means of a speed control switch in the motor base. The current is cut in by a slight backward push on the hand lever, and is cut off and the brake automatically and simultaneously applied by a forward movement of the hand lever.

Brake action is smooth, stopping the motor in 3 seconds when running at high speeds, and in 1½ seconds at low speed. The brake operates against a large diameter extended surface of the motor spindle and means are provided for regulating the brake pressure and adjusting for wear of the brake shoe. A hollow spindle within the motor permits the insertion of a 1-in. rod or tube stock 9 in. long from the face of the chuck. The motor is ½ hp. of two-speed design to



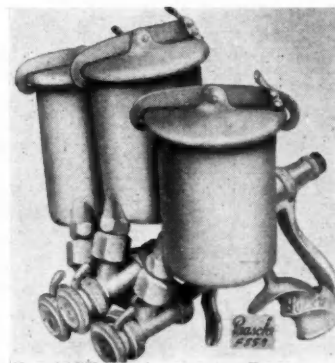
Right side of Ideal speed lathe

provide 2700 r.p.m. and 1350 r.p.m. on D.C.; 3400 r.p.m. and 1700 r.p.m. on A.C. and will operate continuously without overheating. It is totally inclosed and dustproof.

MULTICOLOR AIRBRUSH

APPLICATION of 2, 3 or more colors with a single airbrush is made possible by the new convertible multicolor airbrushes recently placed on the market by the Paasche Airbrush

Co., Chicago, Ill. Each color is controlled independently so that all colors may be applied at the same time or shut off at will, providing a range from the finest line to the widest spray. For high production these airbrushes may be used with pressure feed tanks from 3 to 200 gal. capacity. The



Paasche multicolor airbrush

regular cup containers are ½-pt. size. The length of the new brush is 7½ in. while the one illustrated here weighs 1¼ lb.

Automotive Oddities

by Pete Keenan

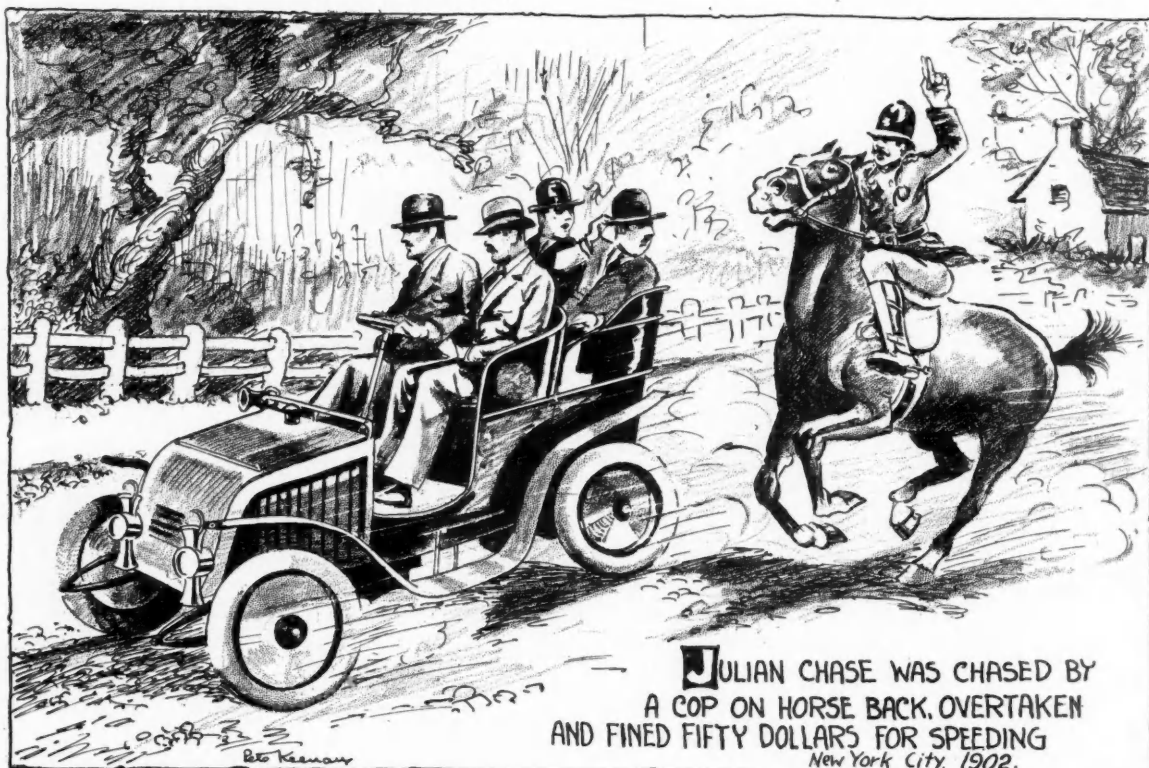


THE "SILVER DART" CLAIMED TO BE THE FIRST AIRPLANE WITH A WATER-COOLED MOTOR.
Nova Scotia, March 2, 1909.

THERE HAS BEEN APPROXIMATELY A 3,000,000 DROP IN THE HORSE POPULATION IN THE PAST FOUR YEARS.



MUAMMER HANUM, WAS THE FIRST WOMAN IN TURKEY TO BE GRANTED A PERMIT TO OPERATE A TAXI CAB. 1929.



JULIAN CHASE WAS CHASED BY A COP ON HORSE BACK, OVERTAKEN AND FINED FIFTY DOLLARS FOR SPEEDING
New York City, 1902.

News of the Industry

PAGE 667

VOLUME 62

Philadelphia, Saturday, April 26, 1930

NUMBER 17

General Motors Earnings Decline by 28 Per Cent

Consumer Sales Decrease
18 Per Cent in Same
Period

Net Exceeds Prediction

NEW YORK, April 23—"Net earnings of General Motors Corp., including equities in the undivided profits of subsidiary and affiliated companies not consolidated, for the first quarter ended March 31, 1930, amounted to \$44,968,587, according to an announcement by Alfred P. Sloan, Jr., president. This compares with \$61,910,987 for the corresponding quarter a year ago. After deducting dividends on preferred and debenture stocks amounting to \$2,422,624, there remains \$42,545,963, being the amount earned on the common shares outstanding. This is equivalent to 98 cents per share on the common stock as compared with \$1.37 per share for the first quarter of 1929.

"For the three months ended March 31, General Motors dealers in the United States delivered to consumers 286,690 cars, compared with 351,079 cars in the corresponding period of 1929. Sales by General Motors manufacturing divisions to dealers in the United States amounted to 323,443 cars, compared with 413,173 cars in the corresponding three months of 1929.

Sales to Dealers

"Total sales to dealers, including Canadian sales and overseas shipments, amounted to 368,635 cars, compared with 523,119 cars in the first quarter of 1929. Overseas shipments during the first three months of 1930 were considerably below shipments during the same period of 1929, due to a desire to adjust stocks in overseas countries in line with changed economic conditions.

"Cash and United States government securities, at March 31, 1930, amounted to \$125,814,939. Net working capital at March 31, 1930, amounted to \$267,791,541, compared with \$251,287,782 at December 31, 1929.

"During the month of March General Motors dealers in the United States delivered to consumers 123,781 cars. This compared with 88,742 in the month of

(Continued on page 671)

March Sales Indicate 17 Per Cent Drop

PHILADELPHIA, April 24—March registrations of new passenger cars were 17 per cent behind last year in the 26 states for which figures have been compiled. In this group of states, Ford shows a March gain of 14 per cent over last year, Chevrolet a loss of 8 per cent, and all other makes combined a loss of 31 per cent.

Tractor Output Gains, Combines Show Decrease

WASHINGTON, April 23—The Bureau of the Census announces that, according to returns received to date in the annual canvass of manufacturers of farm equipment, the total production of tractors in 1929 amounted to 221,200, valued at \$193,324,000, of combines (harvester-threshers), 35,800, valued at \$45,263,000; and of threshers, 14,500, valued at \$11,800,000. Of the tractors 194,300, valued at \$140,204,000, were of the wheeled type, and 26,900, value at \$53,120,000, of the tracklaying type. These figures, as compared with those for 1928, represent substantial increases for tractors and combines, but the production and sale of threshers show decreases.

The statistics for 1929 are preliminary and are subject to such correction as may be found necessary after further examination of the returns. They are based to a small extent on estimated data, but in no case do these estimates exceed 10 per cent of the total.

(See table, page 670)

Hayes Strike Settled

INDIANAPOLIS, April 21—Returning to work with the promise of approximately 90 cents an hour, sheet metal workers and door hangers of the Hayes Body Corp. dissolved the strike that took more than 200 men from their work and caused a lay-off of another 200 or more, affecting body production for two companies.

March Employment Gains in Michigan

Increase is 2.5 Per Cent Compared
With February of This Year

DETROIT, April 21—In the automobile industry in the state of Michigan as of March 15 there were 213,094 employees, an increase of 2.5 per cent over the 207,724 employees in February and an increase of 15.5 per cent over the 184,417 employees in December, according to a report by the state Department of Labor and Industry, based on reports of 40 companies. The aggregate weekly payroll for the automobile industry in the state was \$7,285,678 in March, an increase of 10.9 per cent over the \$6,566,543 in February and an increase of 51.5 per cent over the \$4,806,478 in December. Average weekly earnings per capita in the automobile industry were \$34.18 in March, \$31.61 in February and \$26.06 in December, reflecting, largely, an increase in operating hours, rather than increased wage scales.

A comparison of the increase in activity in the automobile industry in this state with the increase in general Michigan industry is revealed in reports by 447 companies (including the 40 automobile firms) which in the aggregate show an employment increase of 12.6 per cent from December to March and an increase of 2.1 per cent from February to March. The aggregate payroll for these 407 companies shows an increase of 38.0 per cent from December to March and an increase of 9.8 per cent from February to March, while the average weekly payroll increased 22.5 per cent from December to March and 7.6 per cent from February to March.

(See table, page 671)

Fiat Output at Peak

PARIS, April 15—The Fiat factory at Turin is now in full production at the rate of 150 per day of the light car known as Model 514, first introduced to the public in February. With other passenger car models, the output stands at just over 200 per day. Trucks and tractors are in addition. Fiat has just announced a reduction of about 10 per cent on all models but the 514, with credit terms extending over one year and free service throughout Italy for the first 5000 miles.

Men of the Industry and What They Are Doing

Benedict Heads Metal Trade

John G. Benedict, treasurer and general manager of the Landis Machine Co., Waynesboro, Pa., was last week elected president of the National Metal Trades Association which held a convention in New York. Mr. Benedict became secretary and treasurer of the Landis Machine Co. in 1904, and has been actively identified with its growth since that time.

Gillian Succeeds Stout

Joseph Stout has resigned as engineer, passenger car division, of the Lycoming Mfg. Co., and has been replaced by Paul Gillian, according to an announcement from the company. Other changes in the organization include the appointment of John Oehrli as assistant chief engineer, and of P. B. Martin as engineer, truck and industrial divisions.

Greve is in Europe

L. W. Greve, active head of the Cleveland Pneumatic Tool Co., Champion Machine & Forging Co., and Cleveland Rock Drill Co., is on a three-month tour of Europe. He is visiting the principal cities of about 16 countries. At Berlin he will be joined by J. F. Wallace, chief engineer of the Cleveland Pneumatic Tool Co., whose tour will last two months.

Macfee Talks to Indiana Trade

Robert Macfee, secretary of the National Standard Parts Association, talked before the Indiana Automotive Dealers and Maintenance Association on the subject "How Associated Effort Rings the Cash Register" at a banquet held at the Elks Club, Indianapolis, on April 16. Three hundred members of the association were present.

Babb Made Bank Director

Max Wellington Babb, Milwaukee, Wis., vice-president of the Allis-Chalmers Manufacturing Co., has been elected a class B director in group three of the Federal Reserve bank in Chicago, to fill the unexpired term of August H. Vogel, deceased. Mr. Babb's term as director will expire Dec. 31, 1930.

Pierce Adds Directors

Paul G. Hoffman, vice-president of the Studebaker Corp., J. F. Schollkopf, Jr., and Edward N. Burley have been added to the board of directors of the Pierce-Arrow Motor Corp., Buffalo. The board now has 12 members.

Brown Visits Stutz Plant

S. W. Brown, service manager for Warwick-Wright, Ltd., London, England, while visiting the Stutz factory at Indianapolis, remarked that he was

much impressed by the production and service methods of American firms. He remarked in watching a motor block being decarbonized that with American tools, the process took only the services of one man, while in England it was customary to use at least three men.

Wasserfallen Resigns

Charles F. Wasserfallen, for several years works manager and chief engineer of the Detroit Carrier & Mfg. Co., which is now a division of the Houdaille-Hershey Corp., and more recently vice-president in charge of manufacturing of the Oakes Division of the Houdaille-Hershey Corp., has resigned. Mr. Wasserfallen has announced no plans for the immediate future.

Republic Steel Appoints

Executive sales appointments in the new Republic Steel Corp. announced by H. T. Gilbert, vice-president in charge of sales, include: A. E. Walker becomes assistant vice-president; J. M. Schlen-dorf, sales manager of Alloy Steel Products; Norman Foy, sales manager of Mild Steel Products with headquarters at Youngstown.

Goodrich Appoints Groffmann

E. S. Sargeant, vice-president and general manager of the Canadian Goodrich Co., Ltd., announces that R. C. Groffmann has been appointed advertising manager of the company and will be in charge of both tire and footwear advertising at the head office at Kitchener, Ont.

Viscosimeter Appoints Elverson

James C. Elverson, for 10 years general manager of the industrial division of Motometer Co., has been appointed general manager of the American Viscosimeter Co., a subsidiary of General Motive Control, Inc., according to announcement of Joseph Leopold, president.

Kettering Gets Directorship

Charles F. Kettering, vice-president and director of General Motors Corp. and president of the General Motors Research Corp., has been elected to the board of directors of the Yosemite Holding Corp., it was announced last week.

Detroit Aircraft Names Betts

Karl S. Betts has been appointed acting general sales manager, and Joseph A. Benoit as assistant to the general manager of the Detroit Aircraft Corp., according to James Work, vice-president.

Atterbury Appoints Richards

Harry J. Richards has been appointed chief engineer of the Atterbury Motor Car Co., manufacturers of Atterbury Trucks, Buffalo, N. Y.

Chrysler Names Covell

Appointment of J. B. Covell, as New York district manager for the Chrysler Sales Corp., has been announced by E. B. Wilson, director of sales. Mr. Covell was formerly regional manager for the Plymouth Motor Corp. in New York, and prior to that was regional manager in the Chicago district. B. C. Helm, former New York district manager, will be engaged in special sales department work for the Chrysler Corporation.

Davis Joins Durant

R. E. Davis, for many years well known in automotive circles throughout the Southwest and for the last 13 years secretary and general manager of the O'Brien-Davis Auto Co., Dodge Bros. dealer in Omaha, has joined the Durant banner and been appointed manager of the two Durant factory branches in Texas located at Fort Worth and Dallas.

Murrays Resign From Rubber Board

The Murray Rubber Company, Trenton, N. J., announces the resignation of C. Edward Murray, Jr., as president, and his brother, J. Cornell Murray, as a member of the board of directors. C. Edward Murray, Sr., resigned as head of the company some time ago. Mr. Murray has made no plans for the future and no one has yet been selected to take his place.

Henderson Is Promoted

L. T. Henderson, formerly assistant manager of the Ford assembly plant at Portland, Ore., has been appointed manager of the Milwaukee plant, to fill the vacancy caused by the resignation of H. M. Buckley. Mr. Henderson has been in the Ford organization since 1912, starting at Los Angeles.

Almen Joins Kinner

H. V. Almen, formerly with the General Motors Research Laboratories at Detroit, Mich., has been appointed research engineer at the Kinner Airplane and Motor Corp. plant in Glendale, Calif.

Meadowcroft in Europe

Joseph W. Meadowcroft, assistant works manager of the Edward G. Budd Mfg. Co., Philadelphia, former president of the American Welding Society, sailed from New York recently for a six months' trip to Europe.

Dahlquist Joins Keasbey

Chas. S. Dahlquist is now associated with Keasbey & Mattison Co., Ambler, Pa., as sales engineer. He was formerly connected with the Timken Axle Co., and the Eaton Axle Co.

Automotive Construction Shows Gain for April

August, 1929, Level is Reached by Parts, Airplane and Car Plant Building

PHILADELPHIA, April 24—The automobile and parts industry showed a sharp increase in construction activity during the past week, while general building rose to the level of last August, the highest point since in the past seven months.

Most of the automotive construction during the past month has been announced by parts companies, who announced, in some cases, large commitments from automobile manufacturers.

Among the concerns reporting to *Automotive Industries* this week were:

Charles Shilowitz, Jersey City, N. J., architect, has asked bids on general contract for an eight-story automobile service and garage building to cost over \$300,000.

Middle States Airport Service, Inc., Fulton Field, Akron, Ohio, plans hangar with repair and reconditioning facilities, to cost about \$70,000 with equipment. C. W. Frank, architect.

Empire Auto Body Building Co., Chicago (automobile bodies), leased three-story factory at 2601-9 Archer Ave., with option to purchase, and will remove to that location, providing additional equipment for increased capacity.

Fairfax Airports, Inc., Kansas City, Mo., will soon begin construction of one and two-story hangar at Rosecrans Field, St. Joseph, Mo., with repair and reconditioning facilities to cost about \$50,000. Walter Boschen, St. Joseph, architect.

Indestructible Wheel Works, Inc., Lebanon, Ind. (automobile wheels), purchased plant and business of Bimel Wheel & Spoke Co., Portland, manufacturers of kindred products. Acquired business will be removed to Lebanon and consolidated with purchasing organization. Expansion will be carried out at Lebanon for increased production of steel disk motor car wheels and other wheel products. L. C. Willis is president of Indestructible Co.

Marion Machine, Foundry & Supply Co., Marion, has plans for two-story addition to cost about \$100,000 and will soon take bids on general contract. Hiram Elder is architect.

Bakelite Corp., New York (insulating products), has awarded general contract to J. W. Ferguson Co., Inc., Paterson, N. J., for addition to plant at Bloomfield, N. J., to cost over \$100,000 with equipment. Robert Bolton, Newark, architect.

Firestone Tire & Rubber Co., Akron, Ohio, will take bids early in April for three-story factory branch, storage, distributing and service plant at Baltimore, to cost over \$175,000 with equipment.

Farman Aircraft Corp., operated by H. & M. Farman, Philadelphia, has acquired Southern Field, Americus, Ga., as site for new airplane plant, including parts and assembling divisions, for production of large Pullman type of trimotor aircraft. Several existing hangars and buildings will be remodeled and improved, and new units constructed. Entire project will cost over \$400,000 with equipment.

York Hoover Body Corp., York, Pa. (automobile bodies), will take bids on general contract for two-story plant, to cost about \$40,000 with equipment. W. H. Swartz is architect.

Adams & Hillyer, Inc., New London, Conn. (automobiles), planning forge and blacksmith shop, and woodworking plant, primarily for automobile body repairs and construction, a new department of business now being organized. An existing building on site will be enlarged for machine shop.

Warrior Aeronautical Corp., Alliance, Ohio, recently formed to take over Alliance Aircraft Corp., arranging for early resumption of production, and will devote output largely to glider aircraft to retail at about \$1,500; heavy commercial planes will also be manufactured. The new company will have a working capital of \$150,000 and is headed by James D. Campbell, Kenneth M. Ronan and A. Edward Kunz, all former officials of Stinson Aircraft Corp., Detroit.

City Council, Birmingham, has plans for municipal airport on 300-acre tract, hangars, repair and reconditioning shops and other field buildings to cost over \$100,000 with equipment. A. J. Hawkins is city engineer.

City Council, Fort Worth, Texas, has plans for a one-story hangar, at municipal airport, with repair and reconditioning facilities, to cost about \$35,000 with equipment. O. E. Carr, city manager, is in charge.

Timken-Detroit Axle Co., Detroit (automobile and motor truck axles), has awarded general contract to C. O. Barton Co. for two-story shop addition, to cost over \$40,000 with equipment.

Twin City Motor Bus Co., Minneapolis, Minn., awarded a contract to the Austin Co., Cleveland, a \$50,000 extension to its garage.

Howard Motor Co., Seattle (Wash.) Ford dealer, has awarded the Austin Co., Cleveland, contract for a \$50,000 sales and service building.

Caterpillar Tractor Co., Peoria, Ill. (tractors, graders and harvester combines), awarded the Austin Co., Cleveland, contract for design and construction of a \$200,000 tractor assembly building. The new contract closely follows the completion by the Austin organization, recently completed, of a \$2,000,000 foundry for the company.

Arrowhead Steel Products Co., Minneapolis, maker of automobile parts, will expand by erection of a second story over the middle section of the 600-ft. front factory situated in Northwest Terminal, where a new main entrance will be placed. A heat-treating plant has just been completed adjoining the main building at the rear.

Toro Mfg. Co., 3142 Snelling Ave., Minneapolis, has bought a tract 100 ft. x 100 ft., adjoining the plant for extension as needed. The company makes air-cooled motors, small tractors, mowing machinery, etc. Shipments of products have increased 16 per cent in the last six months.

Diamond T Leases Plant at Long Island City, N.Y.

CHICAGO, April 22—Diamond T Motor Car Co., manufacturer of motor trucks, has leased a block of property at Long Island City, including building on site, with 45,000 sq. ft. of floor space, and is planning an addition to cost about \$100,000 with equipment. The company will develop property for main Eastern works and distributing plant. Thomas L. Huxley, vice-president and general manager in Eastern territory, is in charge.

Wilcox-Rich Net Drops

NEW YORK, April 21—Net earnings of the Wilcox-Rich Corp. for the first quarter of 1930 were well in excess of the dividend requirements, amounting to \$310,997 or 83 cents a share on the 325,737 shares of Class B stock outstanding after deduction of Class A dividends, it was reported last week. Net was equal to \$4.93 a share on the 62,978 shares of A stock. This showing compares with net of \$484,451 after all charges in the preceding year, equal to \$7.69 and \$1.36 a share on the A and B shares respectively, on the basis of the present capitalization.

The Eaton Axle & Spring Co., which recently offered its common shares in exchange for Wilcox-Rich B in the ratio of 85 shares of the former for 100 of the latter, reported net of \$314,749 for the quarter against \$474,000 in the 1929 period. Allowing for deposit of all of the Wilcox-Rich Class B shares net of \$625,746 is indicated for the consolidation.

This is equivalent after deduction of dividends on the A stock which will remain outstanding to \$1.01 a share on the 576,869 shares of Eaton Axle common, which would then be outstanding and would compare with \$958,451 or \$1.59 a share on the same capitalization for the 1929 quarter.

Rockelman Joins Chrysler in an Executive Capacity

Former General Sales Manager of Ford Motor Co.

DETROIT, April 22—Walter P. Chrysler, president and chairman of the board of the Chrysler Corp., announced today that Fred L. Rockelman, formerly director of sales of the Ford Motor Co., has today become associated with the Chrysler Corp. in an executive capacity. Mr. Rockelman is recognized as one of the ablest executives in the automobile industry and one of the most thoroughly experienced in every phase of motor car production, sales and service. He resigned from Ford March 25. For the present Mr. Rockelman will be attached to Mr. Chrysler's personal staff.

Mr. Rockelman, though now only 44 years old, is one of the pioneers of the automobile industry. He joined the Ford Motor Co. in 1913, the year it was organized, and served continuously with it until he resigned last month. He took an integral part in its growth from the time it produced 1200 cars a year until it reached 2,000,000 a year and was director of sales of the entire Ford organization the year it transacted a business of \$1,000,000,000—the largest single year's business in the company's history.

Having spent his early years in the production and mechanical departments, Mr. Rockelman pioneered in service work which was of paramount importance at that time. Mr. Rockelman then became superintendent of the first motor car assembling plant in this country, established at Buffalo, and soon after, its assistant general manager.

From service and production, Mr. Rockelman sought an opportunity to sell cars. His first sales efforts were pursued at the company's Seattle branch where he remained for three years as branch manager, and then until 1922 continued his success as branch manager in charge of the Indianapolis branch.

Meanwhile, Henry Ford had bought the Detroit, Toledo and Ironton Railroad and made Mr. Rockelman its general manager, with instructions to make it a model, paying railroad. For five years Mr. Rockelman continued in this capacity.

By 1927 the Model T was passing and while the Ford laboratories and engineering offices were working out a new car, Mr. Rockelman was called from his well-nigh completed railroad task to become director of sales of the Ford Motor Co.

Altoona Speedway in Shape

ALTOONA, PA., April 22—The Altoona Speedway is in excellent shape for the 1930 racing season, according to a report of C. G. Dunnells, head of the department of building construction at Carnegie Institute of Technology, Pittsburgh, following inspection of the board oval last week.

Pratt & Whitney Develops Injection Type Engine

Permits Use of Variety of Fuels Without Carburetor

HARTFORD, CONN., April 23—The Pratt & Whitney Aircraft Co., announces perfection of a device which eliminates the usual carburetor and intake system of the gasoline engine. It was tried out recently in a flight test with a fighting plane.

The system is said to measure the fuel precisely, and to deliver it mechanically to each cylinder. A large range of fuels may be used, including both furnace oil and aviation gasoline. The device is covered by patents of Stephen A. Hasbrouck, one of the company's engineers, and by patents pending to other members of the engineering department. The application of this device is not limited to aviation.

It is claimed for this system that it permits of developing greater power with gasoline, and that it functions properly regardless of the temperature of the engine or its position in the air. Cold starting is facilitated and the difficulty previously encountered with ice formation in carburetors during winter operation is eliminated. This was almost as serious a matter in transport operation as ice formation on the wings, as the power was seriously reduced. It is further claimed for this system that it makes it possible to operate on fuel oil without any added engine weight, and that the reliability is increased since the engine's operation is not affected by the missing of one or more cylinders.

As a result of development work, done to date, the Pratt & Whitney Co. believes it possible to make a high-speed oil-burning engine without so much added weight as has heretofore seemed inherent in this type. We are informed that this new development will not be offered as regular equipment until tests under all service conditions have been satisfactorily completed. No technical information and no detail illustrations are available at present.

Flagged Out



Val Haresnape

Former secretary of the Contest Board, A.A.A., whose death occurred April 23. Mr. Haresnape had returned to Los Angeles after managing the Daytona Beach Trials. He was an indefatigable worker in the cause of automobile racing in this country.

Ford Seeks Agreement with Isotta-Fraschini

PARIS, April 15—Ford representatives in Italy are now negotiating with the Isotta-Fraschini Company of Milan for the building of Ford engines and transmissions in a new factory which would be erected in that town. This move was taken as the result of the Italian veto, at the instigation of the War Department, on Ford's proposal to erect a big assembly plant at Livorno.

In asking for facilities to erect a plant at Livorno, the Ford interests pointed out that there was a precedent in the case of Citroen, who assembles cars from French built parts. The Italian authorities now appear to look upon this concession as a step in the wrong direction, and there is every reason to believe that many of the facilities which have been granted Citroen will be withdrawn, and that obstacles will be put in his way.

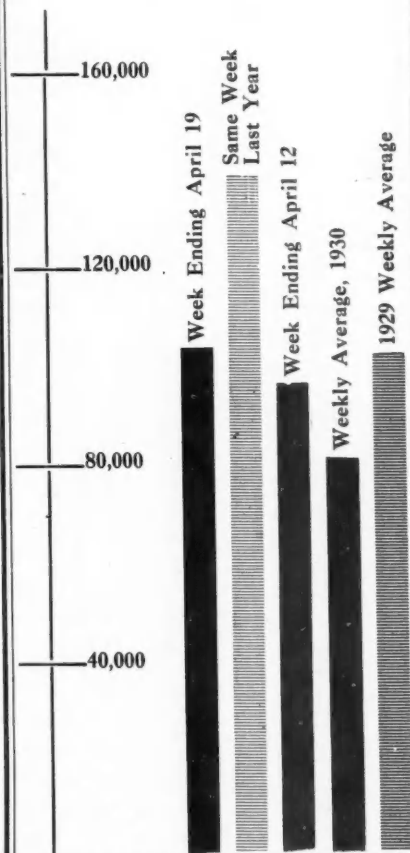
Philadelphia to Create Aero Base on Hog Island

Airplane, Seaplane and Shipping Center Will Cost City \$6,600,000

PHILADELPHIA, April 21—City Council has closed negotiations with United States Shipping Board for purchase of Hog Island Shipyard, a 946-acre tract, for \$3,000,000. Under direction of Public Works Department, it will develop the site as a municipal airport, with hangars and shops.

About 307 acres will be used for the airport and 569 acres will be developed for a marine and rail terminal, with storage and distributing buildings with cranes, conveying and loading and other mechanical-handling facilities. About 70 acres will be employed for establishment of seaplane base, with hangars, shops, etc. The entire project will cost about \$6,600,000 including equipment. It is planned to develop part of tract for leasing to industrial interests.

Automotive Industries
Production Chart
Weekly



The composite chart appearing above will delineate each week production of passenger cars in the United States and Canada, for the week preceding publication of the issue in which it appears, together with production for the preceding week, and other factors. Data used in compiling it are obtained in confidence from a number of sources. Other factors may be added, dependent upon the cooperation of additional sources of information.

Manufacture and Sale of Tractors, Combines, and Threshers: 1929 and 1928

	Sold by Manufacturers					
	Manufactured Number	Value	For Domestic Use Number	Value	For Export Number	Value
Tractors, total, 1929...	221,200	\$193,324,000	156,100	\$132,612,000	*	*
1928...	171,469	162,086,352	99,820	99,148,288	*	*
Wheeled type, total (not including motor cultivators and garden tractors)....						
1929	194,300	\$140,204,000	137,400	\$96,478,000	49,700	\$36,821,000
1928	152,266	113,875,802	86,930	64,555,352	*	*
Tracklaying type, all sizes						
1929	28,900	\$53,120,000	18,700	\$36,134,000	*	*
1928	19,203	48,210,550	12,890	34,592,936	*	*
Combines (harvester-threshers)						
1929	35,800	\$45,263,000	18,000	\$25,073,000	9,700	\$13,196,000
1928	25,392	35,692,864	17,008	26,247,071	6,509	9,612,083
Threshers						
1929	14,500	\$11,800,000	11,400	\$9,437,000	1,400	\$1,293,000
1928	18,429	16,449,879	12,412	10,719,707	*	*

* Can not be shown without disclosing the data for individual establishments.

Reeves Says Industry is Getting Into Stride

Good Weather Real Aid, He
Says in Radio Talk

WASHINGTON, April 22—Automobile production is just getting into high speed after having traveled in second for the past four or five months, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, declared Saturday night in a radio talk over the N.B.C.

April production, Mr. Reeves said, was running well ahead of March, and he emphasized the point that current production is based upon the requirements of dealers.

"Good weather is the real spring board for our business because then the American citizen thinks of good looking cars, just as he thinks of good looking clothes and good looking homes," Mr. Reeves said. "The American nation has always responded to the offering of meritorious products when coupled with style and beauty.

"We do not expect to approach the record production of last year, but the 1,045,000 vehicles made in the first three months compare favorably with 1928, which might be considered a normal year.

General Motors Earnings

(Continued from page 667)

February and with 166,942 in March, 1929. Sales by General Motors manufacturing division to dealers in the United States amounted to 118,081 cars, as compared with 110,904 in February and as compared further with 176,510 in March, 1929.

"Total sales to dealers, including Canadian sales and overseas shipments, amounted to 135,930 cars, as compared with 126,196 in February and as compared further with 220,391 in March, 1929.

"The following table shows sales to consumers of General Motors cars in continental United States, sales by the manufacturing divisions of General Motors to their dealers in continental United States, and total sales to dealers, including Canadian sales and overseas shipments:

	Sales to Consumers (U. S.)	
	1930	1929
Jan.	74,167	73,989
Feb.	88,742	110,148
March	123,781	166,942
	Sales to Dealers (U. S.)	
	1930	1929
Jan.	94,458	95,441
Feb.	110,904	141,222
March	118,081	176,510
	Total Sales to Dealers, Including Canadian Sales and Overseas Shipments	
	1930	1929
Jan.	106,509	127,580
Feb.	126,196	175,148
March	135,930	220,391

"These figures include sales of Chevrolet, Pontiac, Olds, Marquette, Oakland, Viking, Buick, LaSalle and Cadillac passenger cars and trucks."

Last Flight



Capt. L. M. Woolson

Captain Lionel M. Woolson, aeronautical engineer of Detroit and designer of the Packard Diesel airplane engine, was one of three men killed when an aeroplane crashed against the side of a hill in a blinding snowstorm near Attica, N. Y. The others were Charles H. Knight, a test pilot, and Harold B. Scutt, Douglastown, L. I., who was piloting the plane.

Capt. Woolson was born in Los Angeles, June 7, 1888. Graduated University of London; joined Bijur organization, 1912. In charge of tests, U. S. A., McCook Field, Dayton, 1917. Aided in design of Liberty engine.

Glidden Takes Buick Retailing From New York Factory Branch

NEW YORK, April 26—Glidden-Buick Corp., which is now in its twenty-first year retailing Buick cars in New York, has taken over the entire retail department of the New York branch of the Buick Motor Co. A. G. Southworth, who resigned from the management of the branch early this year, returns as head of the Glidden company.

Plans Automobile Salvage

CHICAGO, April 21—The General Auto Reconstruction Co., 6126 Broadway, has been incorporated under the laws of the state of Illinois, with a capital of 75 shares of no par value, to reconstruct automobile materials. Incorporators were Eric Hanson, Charles I. Larson and Carl Zattestrom.

Cadillac To Make Air Engines

DETROIT, April 24—Offering of its Vee-type eight and 16-cylinder engines for marine and aviation use is contemplated by the Cadillac Motor Car Co., according to a statement issued by Lawrence P. Fisher, president.

Automotive Demand Gains in Alloy Steel Market

Buying of Cold-Finished Bars
Also Improves

NEW YORK, April 24—A good indication of the slow but steady improvement in automotive buying of steel is furnished by the better position in which makers of cold-finished steel bars find themselves. While recent week-to-week gains have been slight and, therefore, hardly noticed, comparison with the rate of operations a month and two months ago is highly encouraging.

A decided improvement in the demand for automotive alloy steels is also reported. Cold-rolled strip steel demand has made gains, but is still far behind the rate at which hot-rolled strip steel is moving into consumption. Demand for full-finished automobile sheets continues good. Prices all along the line are only moderately steady, competition in nearly all descriptions of finished steel being extraordinarily keen. Under these conditions, quoted prices are rather an indication to the market than the actual figures at which much tonnage business is being placed.

At the same time, the feeling persists among both buyers and sellers of steel that the present somewhat ragged condition of the market does not fore-shadow any out-and-out declines. In fact, the very opposite is generally looked for. Prices are expected to become firmer rather than otherwise, as some of the backward demand begins to make itself felt. No one, however, looks for any marked changes in the price structure over the next few months.

The general trend of commodity markets, after the tariff bill is out of the way, will not be without its influence on the steel market.

Pig Iron—Most of the automotive foundries have covered their second-quarter requirements. Prices continue unchanged, the tone of all markets being rather steady.

Aluminum—The decline in the price of copper, which usually brings in its train speculation as to the future course of aluminum, has in nowise affected the aluminum market. Automotive demand is largely of a routine character. Prices are unchanged.

Copper—Much of the prevailing uncertainty regarding the price outlook was dispelled when the leading fabricating interest issued its price list on metal products based on the 14-cent level. Previously there had been some talk of producers considering a return to the 18-cent price, while elsewhere in the market rumors were afloat that sales had been made at below 14 cents. Now that the 14-cent price seems to have been definitely established for the time being, an increase in domestic buying is confidently looked for.

March Employment in Michigan Car Plants

Plant Classification	Gain in Employment		Per Cent Gain in Payroll		Per Cent Gain in Average Weekly Earnings	
	Feb. to Mar.	Dec. to Mar.	Feb. to Mar.	Dec. to Mar.	Feb. to Mar.	Dec. to Mar.
40 automobile firms	2.5	15.5	10.9	51.5	8.1	31.1
447 firms (including the 40 automobile companies)	2.1	12.6	9.8	38.0	7.6	22.5

Cleveland Dealers Join Scrap Firm in Junking

Cooperative Concern to be Formed to
Wreck up Old Automobiles

CLEVELAND, April 21—In connection with the "highway safety" plan for the scrapping of cars unfit for operation, a corporation has been formed for cooperation between the A. Shaw Co., and the Cleveland Automobile Manufacturers Association. The cooperative concern will be incorporated as the Cleveland Guarantee Auto Scrapping Co. The Shaw company, which has been in the business for more than 30 years, finances, establishes and operates the yard for the demolition of "junkers" with the trade association as partner. The joint corporation is so organized that the dealers, through their association, can dictate policies as to handling of cars, parts, etc., while advantage is taken through the metal company.

Definite plans to insure removal from circulation of cars unfit for operation have been put into effect by numerous factories in the National Automobile Chamber of Commerce. This includes payment from funds established by the factories of bounties to dealers for each car taken in by the dealer and then demolished, according to the announced plan.

The Cleveland plan provides for the scrapping of cars of any and all makes. In turning "junkers" cars over to the cooperative yard, the dealer or car owner will be immediately paid in cash for the car. Dealers representing factories offering bounties will receive that factory bounty in addition. The cooperative arrangement also is such that through the association, a share of any profits from the enterprise will be available for distribution among the dealers pro rata of the number of cars turned in for destruction.

Stutz Prices Increased

INDIANAPOLIS, April 21—Prices of Stutz automobiles have been advanced from \$150 to \$300 on individual units according to model and equipment, according to E. S. Gorrell, president of the Stutz Motor Car Co. of America.

This change does not affect any of the Blackhawk line, said Mr. Gorrell. The change was decided on, asserted Gorrell, after a survey disclosed an increase in material costs and also a decision to increase the engineering precision and general equipment of the cars.

Milwaukee Sales Gain

MILWAUKEE, April 23—A gratifying situation with respect to new passenger car sales in Milwaukee and Wisconsin is revealed by official figures now at hand, covering the first quarter. Total registrations for the period were 17,761 cars, compared with 13,676 in the same quarter of 1929, which was by far the best in history. The gain is 30.29 per cent for March.

Tariff Countervailing Duty Restored in Conference

WASHINGTON, April 24—Senate and House conferees on the Hawley-Smoot tariff bill last Friday agreed to the restoration of the countervailing provision in the automotive and other paragraphs of the measures. While it may have been a coincidence only, the action was determined upon on the same day that the new French tariff in automotive products was promulgated, and the upshot is that the same duties will be imposed on imports of this kind from France as those which France assesses against American automotive products, though the American duty is limited to 50 per cent ad valorem.

The French duty was 45 per cent, but the duties under the new specific rates run as high as an equivalent of 65 per cent ad valorem. The American automotive industry itself was agreeable to the elimination of the countervailing provision before the new French tariff was adopted. The State Department had suggested that the countervailing provisions in the tariff be stricken out, but the sentiment in Congress was strongly opposed to such action, and the new French tariff on automotive products is said to have strengthened this sentiment.

Mayo Sees De Luxe Planes

DETROIT, April 22—De luxe air transport service with extra-fare planes for those who are willing to pay for additional comfort is foreseen by William B. Mayo, head of the airplane division of the Ford Motor Co., who has just returned from an air tour of the West. The introduction of club planes with luxurious interior appointments and accommodations will be a logical step as the result of reductions in air passenger rates, Mr. Mayo said.

"Before these reductions air passengers as a general rule were persons who were not concerned with costs. But since fares have been brought within the limits of the traveling man's expense account, the air lines are carrying large numbers of salesmen and other business representatives.

"There still exists a class of persons who are willing to pay higher fares for additional comfort in airplane travel, just as there is a class of rail passengers who patronize the extra-fare trains."

To Hold Acetylene Congress

PHILADELPHIA, April 22—The Tenth International Acetylene Congress will be held in Zurich, Switzerland, July 9-12, 1930. It will cover the acetylene, autogenous welding and allied industries. The congress will be divided into a number of sections, as follows: Calcium carbide, acetylene, combustible gases, oxygen, oxy-acetylene welding, electric welding, application of autogenous welding, gas-cutting, regulations, prevention of accidents, instruction and publicity.

Willys-Overland Shows \$136,443 in Earnings

Common Stock Dividend Passed, But
Directors Hold Position is Sound

TOLEDO, April 22—Earnings of the Willys-Overland Co. for the first quarter of 1930 announced by L. A. Miller, president, in his report to directors at their meeting last week, were \$136,443 after providing full depreciation on property items, adequate reserves, amortization of tools, advertising and other charges, except Federal taxes.

The company received during the first quarter the benefits of a reduction in Federal income taxes of prior years. Cash on hand is approximately \$6,000,000 with no bank borrowings, and working capital is \$20,428,204 with current asset ratio of 4.23 to 1 according to their financial report submitted by President Miller. Although the financial position of the company is sound, the directors decided to pass the dividend on the common stock until general conditions in the industry are more clearly established.

Reduced earnings of the first quarter were largely responsible for this action. Common dividends had been paid recently at a rate of 30 cents a share quarterly and current due May 1. Regular quarterly dividend of \$1.75 on the preferred stock was declared payable July 1 to stock of record June 18. Preferred distribution will amount to \$275,567. A year ago the first quarter was one of peak operations and the earnings were \$2,028,020 after interest and depreciation, but before Federal taxes.

Motor Wheel Net Declines

DETROIT, April 21—The Motor Wheel Corp., Lansing, Mich., has reported for the quarter ended March 31, 1930, a net profit of \$594,435, after all charges including provision for Federal taxes. This is equivalent to 72 cents a share on the 825,000 shares of no par value stock outstanding, and compares with a profit of \$1,108,803, or \$1.61 a share, on 687,500 shares outstanding in the first quarter of 1929. Earnings for the first quarter this year exceeded those of the corresponding periods of 1928, 1927 and 1926. The balance sheet as of March 31, 1930, shows current assets in amount of \$8,281,845 and current liabilities in amount of \$1,260,717.

G. W. Brogan

TOWSON, MD., April 21—G. W. (Steve) Brogan, head of the G. W. Brogan, Inc., advertising agency, and formerly advertising manager of Black & Decker Mfg. Co., Towson, Md., was killed recently in an automobile accident.

With Mrs. Brogan he was returning from a business trip to New York. The accident occurred between Trenton and Philadelphia. His widow was severely injured in the crash.

Mr. Brogan formed the Service Associates, and later organized the firm which he headed.

Eaton Elected to Board of Youngstown Company

Opposition to Bethlehem Merger Plan Gets Three Directorships

YOUNGSTOWN, OHIO, April 22—Additional representation on the board of directors of the Youngstown Sheet & Tube Co. was given to the Cyrus S. Eaton group today at the thirtieth annual stockholders' meeting. The number of directors was increased to 12 from 11, of whom four represent the so-called Eaton-Otis-Wick interests. The Eaton representatives are Mr. Eaton, George C. Brainard, Hugh B. Wick and S. Livingston Mather. Mr. Wick was a member of the proxy committee opposed to the sale of the Youngstown company to the Bethlehem Steel Corp.

Directors elected were: T. J. Bray, George C. Brainard, James A. Campbell, John W. Ford, Richard Garlick, Frank Purnell and John Tod of Youngstown, H. G. and S. Livingston Mather of Cleveland.

The officers of the company were reelected by the directors this afternoon. Frank Purnell, named president last fall, was reelected. The executive committee was enlarged and the following were named as members: Mr. Campbell, Mr. Bray, Mr. Garlick, Mr. Dalton, Samuel Mather and Mr. Eaton.

The official recognition of Mr. Eaton is interpreted in some quarters as indicating that a compromise may be reached in the contest to merge with Bethlehem, which has been vigorously opposed by Mr. Eaton.

Elmer T. McCleary

Elmer T. McCleary, 51 years old, president of the Republic Steel Corp., died Tuesday in Youngstown, Ohio, after an operation. He had been ill for a week. He went to Youngstown in 1901 and started as a metallurgist with the Sheet & Tube Co., which he served for twenty-two years. For many years he was a vice-president in charge of operations.

Keystone Adds Workers

BRISTOL, PA., April 22—Keystone Aircraft Corp., a unit of Curtiss-Wright Aircraft Corp., New York, is arranging for increased production at its local plant, and will add about 400 to working force during the next 60 days. Plant area has recently been increased to 400,000 sq. ft., compared with about half that amount a little more than a year ago.

Motors Lose Place as Export Leaders

WASHINGTON, April 24—Unmanufactured cotton, which had been passed by automobiles, parts, and accessories as our leading export for three-quarters of 1929, regained its dominant first place during the last quarter of the year because of the usual heavy seasonal shipments of cotton, coupled with a sharp decline in automotive exports. Forty-two per cent of the 1929 exports of cotton were shipped during the fourth quarter. Cotton led automobiles for the year by \$232,000,000 according to the Foreign Commerce Department of the U. S.

Timken Bearing Reports

CANTON, April 15—Net earnings of the company, during the first three months of 1930 aggregated \$3,106,659.31, according to a report submitted to stockholders at the annual meeting April 15. While no comment was made relative to the outlook for the remainder of this year the general tone of the meeting was optimistic.

Henry H. Timken, Jr., was elected a director. Others renamed to the directorate were H. H. Timken, J. G. Obermier, M. T. Lothrop and J. W. Spray, W. R. Timken, New York, and A. C. Ernst, Cleveland.

Committee is Named for World Aero Safety Meet

H. H. Blee, Department of Commerce, Heads Group to Handle Delegation

WASHINGTON, April 24—The American committee in charge of the delegation which will attend the First International Aerial Safety Congress, to be held Dec. 10 to 23 in Paris under the French Air Ministry, will include Harry H. Blee, director of the Aeronautical Development of the Department of Commerce; Edward P. Warner, president of the S. A. E. and editor of *Aviation*; Prof. Alexander Klemin, A. S. M. E.; Paul H. Brattain, Aeronautical Chamber of Commerce; W. R. Enyart, National Aeronautical Association, and Frederick R. Neely, chief of the Aeronautical Information Division of the Aeronautics Branch of the Department of Commerce.

Alternates are George W. Lewis, S. A. E., and Rear Admiral H. I. Cone, U.S.N., retired, A. S. M. E. Mr. Blee is chairman of the committee and Mr. Neely will serve as secretary.

"Interest in the Congress is not limited to the individuals who will prepare papers for presentation," Chairman Blee explained. "The organization of the Congress provides for honorary members and adhering members. A person may become an adhering member without going to Paris for the Congress or without presenting a paper, by the payment of a registration fee of 100 francs, at the current rate of exchange, which entitles him to the right of two communications and to the volumes containing the reports of the Congress. To take part in the discussions of the Congress, a person must be registered either as an honorary or adhering member.

Persons interested in becoming adhering members of the Congress for the purpose of obtaining the proceedings at the cost of the registration fee may obtain application forms and other details of registration from the Aeronautics Branch, Department of Commerce, Washington, D. C.

The foremost officials and experts of France, headed by President Doumergue, are closely identified with the coming event. The Congress is under the patronage of Laurent Eynac, Minister of Air, who has entrusted its organization to the French Committee for Aeronautical Propaganda which is under the direct chairmanship of the Air Minister and Marshall Iyautey, chairman of the committee.

Chamber to Consider Exports

WASHINGTON, April 21—Foreign traders will find plenty to interest them at the Eighteenth Annual Meeting of the United States Chamber of Commerce, to be held in Washington, April 28 to May 1.

A variety of important foreign trade problems will be discussed at a round table meeting on the afternoon of April 29, under the heading "What's Ahead for Business in Exporting."

Rubber Invoiced to U. S.

WASHINGTON, April 22—American consular officers at Singapore, Penang, Colombo, Batavia, Surabaya, Medan, London and Liverpool, whose vise invoices on all rubber shipped to the United States from Malaya, Ceylon, Netherland East Indies, and the United Kingdom, report by cable the following amounts of rubber invoiced during the week ended April 19, as compared to amounts invoiced in 10 preceding weeks:

1930	Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	TOTAL
Feb. 8.....		9,902	1,788	2,572	31	14,293
Feb. 15.....		7,223	1,312	1,315	59	9,909
Feb. 22.....		7,010	1,223	2,389	51	10,673
March 1.....		8,146	2,315	2,898	57	13,416
March 8.....		6,637	925	1,990	45	9,597
March 15.....		6,256	658	1,786	10	8,710
March 22.....		7,075	753	1,997	19	9,844
March 29.....		5,867	1,335	1,462	Nil	8,664
April 5.....		7,435	779	2,109	Nil	10,323
April 12.....		7,026	1,235	1,527	7	9,795
April 19.....		6,013	493	1,109	21	7,636

All figures in long tons.

Bendix Plans to Issue Stock in Holding Company

Will Consolidate Several Instrument Divisions

CHICAGO, April 21—W. S. Aagard and Co. heads a banking group which will shortly offer stock in the Commercial Instrument Corp., a new company formed by Vincent Bendix, Orville Thompson and associates. The offering is expected to take the form of 25,000 units, each unit to consist of one share of Class A convertible preferred stock and one share of Class B stock together with a warrant to purchase an additional share of Class B stock until July 1, 1936, at prices ranging from \$3 to \$9 a share. The stock will be priced around \$22.50 a unit.

The company will be headed by Orville W. Thompson as president. W. J. Buettner, vice-president of the Bendix Aviation Corp., will act as secretary and treasurer, and Vincent Bendix will act as a director. The corporation is a consolidation of companies manufacturing a diversified line of instruments and allied products for aircraft, automobiles and locomotives. Its subsidiary companies include the American Paulin System, Inc., James P. Marsh Co., Sargent Co., Tiffany Co., Carl A. Norgren Co. and Connecticut Telephone & Electric Co.

Canada Affected by Tariff

MONTREAL, QUE., April 22—Canada's foreign trade with Australia in automobiles and parts to the tune of \$8,000,000 will be affected by the sweeping impost of a 50 per cent super tax imposed by that country against so-called luxuries. For the fiscal year ended March 31, 1929, Canada exported automobiles, trucks and parts to Australia to the value of \$7,919,548, representing about 18 per cent of Canada's total export trade in these commodities. It now appears that the 50 per cent super tax is added to the present tariff net rates. The biggest individual group in the automobile exports was that of cars valued at \$500 or less, a total of \$4,786,896 being exported in the fiscal year of 1929.

Fred V. McGraw

DETROIT, April 22—Fred V. McGraw, sales manager of the Ray Day Piston Co., Detroit, was fatally injured in an automobile accident on April 12 and died in the Mount Carmel Hospital April 14 at Columbus, Ohio.

At the time the accident occurred Mr. McGraw was accompanied by a salesman, A. C. Rule. Mr. Rule suffered a broken hip bone and other minor injuries. It is expected that within a month he will be out of the hospital.

Mr. McGraw was born Aug. 30, 1888, and acquired his technical education at Leland Stanford University, California, from which he graduated. He was a member of the Alpha Delta Phi Fraternity.

Coatalen Returns to Europe

NEW YORK, April 22—Louis Coatalen, designer of the "Silver Bullet," so far unsuccessful contender for premier speed honor at Daytona, sailed from here last week on the *Aquitania*. Passage was booked by Kaye Don, driver of the car, on the same ship but officials of the Cunard Line stated that Mr. Don's reservations were not taken up.

Elkhart-Lever Merger Awaits State Approval

INDIANAPOLIS, April 21—The proposed merger of the Elcar Motor Car Co. of Elkhart, Ind., and the Lever Corp. of Quapaw, Okla., with a capitalization of \$5,000,000 today awaited approval of the Indiana securities commission to become an effected consolidation. The proposed merged corporation, which will be under the laws of Indiana, will be known as the Lever Corp. of Indiana, and will manufacture automobiles using the Powell Lever motor.

If the merger receives approval, the new firm contemplates the expenditure of \$500,000 in improvements on the plant at Elkhart. The merger will also put into effect a cross license of all patents held by the parent companies. The Elcar Co. started in the automobile business in 1910, as the Elkhart Carriage Co. In 1915, a reorganization changed the name to the Elkhart Carriage and Motor Co., which existed until 1922, when Fay B. Sears and A. M. Graffis joined and reorganized the firm as the Elcar Motor Car Co. The carriage company was founded in 1875.

Byrd to Get Chamber Medal

NEW YORK, April 21—The Aeronautical Chamber of Commerce of America, Inc., has approved the striking of a gold medal to be presented to Rear Admiral Richard E. Byrd and the members of his expedition. The gold medal will be presented to Admiral Byrd and silver duplicates will be presented to the 65 members of his expedition. There will also be about 1000 bronze replicas presented to those attending the dinner at which Admiral Byrd's medal will be presented. The only other medal ever presented by the chamber was that given to Col. Charles A. Lindbergh on his return from his flight to France.

N.A.D.A. Studies Used Car Reports

LOUISVILLE, April 22—The National Automobile Dealers Association headquarters, Chicago, is taking a good deal of interest in the methods of the Louisville Automobile Dealers Association's methods of compiling and disseminating used car information.

Karry-All Opens Factory

OMAHA, April 21—Karry-All Sales and Service Co. has opened a factory in Omaha with A. L. Shidler as manager and Leo Beddle as state representative. The firm will manufacture and service Karry-All equipment. About 100 will be employed at the beginning of production.

Ford Long Beach Plant Opened with Ceremony

Present Schedule Calls for 300 Cars a Day

LOS ANGELES, April 21—The thirty-fifth Ford assembly plant in the United States was officially opened at Long Beach Harbor, Calif., on Monday, April 21, when officials and civic body representatives numbering 600 gathered at a luncheon and dedication exercises at the new plant.

The Ford ship *Oneida* arrived from Chester, Pa., with the first shipment of parts for the plant, during the exercises, supplying materials for the 2100 workmen employed. Capacity of the plant is 370 cars for an eight-hour day with the present schedule calling for 300.

The plant is on Cerritos Channel with dock space of two ships, three railroad tracks and room for 60 freight cars, 40 acres of space and with two buildings, the main assembly plant and a two-story warehouse. The plant is to supply southern California, Arizona, and parts of Nevada and New Mexico.

Advance-Rumely Shifts Plant

CHICAGO, April 21—Advance-Rumely Company, manufacturers of farm machinery, announced at its annual meeting in Laporte, Ind., the permanent closing of its plant at Battle Creek, Mich., formerly the Advance Thresher Co. All manufacturing will be done at Laporte as soon as the Battle Creek plant's present production schedule is completed, probably within 2 or 3 months. About 400 workers are now employed at Battle Creek. The Laporte plant will be shut down for a short period this summer to rearrange the layout. A. H. Berger, vice-president of the company, and Sheldon Clark, vice-president of the Sinclair Oil Company, were elected directors to succeed J. Hirsch and Morris Fox.

Enter Tourist Trophy Run

LONDON, April 4—Forty-four entries have been received for the Tourist Trophy race, organized by the Royal Automobile Club, to be held for the third year in succession on the Ards Circuit, near Belfast, Northern Ireland. The cars range in size from Austin Sevens (including three supercharged models entered by Sir Herbert Austin) to a Mercedes Benz of over eight liters piston displacement that will be driven by last year's winner, R. Carraciola. No American cars have been entered this time.

Foote Bros. Breaks Record

CHICAGO, April 22—New business estimates of Foote Bros. Gear and Machine Company in the first quarter of 1930 approximated \$2,500,000, which is an all-time record for the company, according to W. C. Davis, president. In March, 1930, new business showed a gain of 111 per cent over February and was nearly 120 per cent greater than in January, Mr. Davis said.

March Output Highest Since Last September

Production of Trucks Superior to Preceding Seven Months

WASHINGTON, April 24—Making a gain of 77,360 units, the production of motor vehicles in the United States in March aggregated 401,378 as against 324,018 in February, according to reports received by the Department of Commerce. The March total was the highest since last September, when the output of motor vehicles was 415,912.

The March output of passenger cars was 335,789, comparing with 275,811 in February, a gain of 59,978, and was the highest since last September. The truck output of 64,200 in March was the highest since last July with a total of 73,649, and exceeded by 17,035 the February total of 47,185. Taxicabs to the number of 1389 were produced in March as compared with 1022 in February.

For the first quarter of the current year 998,566 motor vehicles were manufactured in the United States as against 1,452,910 for the corresponding period of last year. The 1930 quarter production consisted of 846,127 passenger cars, 149,456 trucks and 2983 taxicabs. For the corresponding period of last year the output was made up of 1,266,434 passenger cars, 180,225 trucks and 6251 taxicabs.

Canadian production in March totaled 20,730 motor vehicles, the highest since last June with a total of 21,492, and a gain of 5182 over the February output of 15,548. Passenger cars produced in Canada in March amounted to 17,165 as against 13,021 in February, while truck production totaled 3565 and 2527 respectively. For the first three months of 1930 motor vehicles to the number of 46,666 were produced in Canada as against 93,409 for the corresponding period of last year.

Ford Truck Has Gear Option

DETROIT, April 21—Model AA Ford trucks now are available in two gear ratios. In addition to the 6.6 to 1 ratio, the truck is being produced with a ratio of 5.14 to 1. New ratio increases speed approximately 28 per cent.

Stromberg Changes Name, Moves

CHICAGO, April 21—The name of the Stromberg Motor Devices Co. will be changed to Bendix Stromberg Carburetor Co., effective May 1. Company is moving its entire plant from Chicago to South Bend, Ind., occupying new office and factory building.

Detroit Gear Sales Gain

CHICAGO, April 21—Sales of Detroit Gear and Machine Co., subsidiary of Borg-Warner Corp., in the first quarter of this year were the largest of any similar period in the history of the company and 7 per cent ahead of the first quarter of 1929.

Chicago to Tax Private Garages
CHICAGO, April 21—Judge Hugo Friend has dissolved the temporary injunction secured against the enforcement of the ordinance of the City of Chicago imposing a license fee on private garages, storing five or more cars, thereby putting the city in a position to proceed with the collection of the fee. The decision will probably be appealed to the Supreme Court.

Mooney Sees Depression as Temporary Effect

NEW YORK, April 21—James D. Mooney, vice-president of General Motors Corp., and president of General Motors Export Co., believes that the world is entering a "temporary economic era which will see all business, including our own, proceed at volume levels somewhat lower than those to which we have become accustomed," according to a personal message he has directed to the employees of the export company. Mr. Mooney mentions this fact in an appeal to the employees of the company to extend their best efforts to keep up General Motors business in the increasingly competitive export field.

du Pont Earnings Decrease

NEW YORK, April 21—E. I. du Pont de Nemours & Co. report earnings for the first quarter of the current year of \$17,347,626, of which \$15,854,647 or \$1.52 a share is applicable to common stock. This compares with earnings of \$23,847,677 or \$2.42 a share for the corresponding quarter of last year.

Of these earnings, \$10,481,065 were derived from holdings in General Motors Corp. as compared with \$17,466,131 from holdings in this company for the first quarter last year. It will be recalled that General Motors paid an extra dividend during the first quarter last year.

During the quarter, the value of the company's holdings in General Motors was adjusted to \$187,147,875 as compared with \$164,690,130, the figure at which it was adjusted a year ago. This corresponds to the net asset value as shown by the balance sheet of General Motors of Dec. 31, 1929, and places the stock at \$18.75 a share as compared with \$16.50 previously.

FWD Adds Model

CLINTONVILLE, WIS., April 22—A 2½-ton four-wheel drive truck equipped with a six-cylinder engine, seven-speed transmission and four-wheel brakes is the latest addition to the FWD family. It is designated as Model HH6. The engine, with a bore and stroke of 3¼ x 4¼ in., has a piston displacement of 315 cu. in. and develops 66 hp. at 2000 r.p.m. Cylinders are cast in block, and the crankshaft is carried in seven bearings. Oil is forced from a special base designed to keep the oil surface level under all conditions, to provide adequate lubrication when the truck is operated on steep grades. A dry multiple disk clutch is used in connection with a seven-speed transmission, which is mounted amidships.

Minority Would Simplify Bus Bill Provisions

Elimination of Convenience Certificate Clause Asked

WASHINGTON, April 24—Elimination of the provisions requiring a certificate of public convenience is recommended in a minority report of the Parker motor bus bill, recently reported favorably by the Senate Committee on Interstate Commerce. The minority report, prepared by Senator Dill, Democrat, of Washington, contends that the demand for the provisions authorizing the Interstate Commerce Commission to grant such certificates comes from the railroad and bus owners now engaged in interstate motor bus business, and since present operators may continue in business for 90 days and thereafter if they have made application for a certificate of public convenience and necessity, the thousands which will file such applications will have to wait a long period before the Commission can act.

The report says the provision will set up another bureaucratic department of the government and will prevent competition that brings lower rates and better service to the people. It is urged that there is no public demand for such a provision.

In addition to Senator Dill, the report is signed by Senators Pine, Republican, Oklahoma; Brookhart, Republican, Iowa; Wheeler, Democrat, Montana; Howell, Republican, Nebraska, and Pittman, Democrat, Nevada.

Oliver Companies Sales Gain

CHICAGO, April 21—The Oliver Farm Equipment Co. reports that sales in the first quarter of the present year were slightly ahead of sales in the corresponding period a year ago, and indications are that the first half of 1930 will show an improvement over the first six months of 1929. Last year, the first since the merged companies began operating under a unified management, the company reported sales of \$26,698,802. Approximately 40 per cent of the equipment company's business is transacted in the first six months of each year.

North Carolina Sales Poor

RALEIGH, N. C., April 21—Sales of new automobiles continue to amount to about one-half the number of new cars that were being sold this time last year, according to Sprague Silver, chief of the automobile license division of the State Department of Revenue. New sales for March this year, including trucks, amounted to only 3697 cars, compared to 6435 cars sold in March of last year.

Fleet Gets Army Order

GLENDALE, CAL., April 22—The Kinner Airplane and Motor Corp. has been informed that Fleet Aircraft Corp., of Buffalo, N. Y., has received an order from the United States Army for 15 Kinner powered fleet training planes, and 14 extra Kinner engines.

Goodrich Plans Issue of \$30,000,000 in Bonds

Debentures Will be Used to
Liquidate Current Debts

AKRON, April 21—The B. F. Goodrich Co. will issue \$30,000,000 in 6 per cent convertible bonds within a short time, according to word received in local banking circles today. The new financing will be in the form of 15-year convertible gold debentures with conversion privileges attached and allows the buyer to convert the present bond issue into common stock of Goodrich company at graduated prices.

The purpose of the new bond program is reported to be for liquidating current indebtedness, a substantial amount of which was incurred in acquiring assets and business of the Hood Rubber Co. last August, and the Miller Rubber Co. during February.

Capitalization of the Goodrich Co. after completing present financing will be as follows: 25-year 6½ per cent first mortgage gold bonds outstanding \$21,572,000, 15-year 6 per cent. Convertible gold debentures (this issue) authorized \$30,000,000 and a like amount to be issued. At present there are \$31,532,000 of 7 per cent cumulative preferred shares of \$100 par value outstanding, subsidiary funded debt is placed at \$12,152,640 at the close of the fiscal period.

There are 4,000,000 shares of Goodrich common authorized which will be more than enough to take care of any stock issued for sale to employees or to take care of the conversion benefits of the new bonds. At present there are 1,167,142 shares of common stock outstanding. Indicated market value of the preferred and common stock of this organization based on current market quotations is approximately \$91,000,000.

Martin Truck Moves Office

NEW YORK, April 21—Martin Motor Truck Corp. has moved its New York office from the General Motors Building to 42 W. Sixty-third Street. The company has a model of its light delivery truck on exhibit at its new headquarters. The plant of this company is still at Garden City, L. I., although considerable progress is being made on its new plant at Waverly, N. Y.

Ford of Canada Steps Up Output

WINNIPEG, MAN., April 21—The local plant of the Ford Motor Car Company of Canada is working on a schedule of 100 cars per day, production having been stepped up from 75 cars per day. About a hundred men will be added to the payroll early next month.

Borg-Warner Service Co. Gains

CHICAGO, April 22—Sales of the Borg-Warner Service Parts Co. increased in each of the first three months of 1930 over the preceding month and present indications point to further improvement in the second quarter.

Enlarges Testing Laboratory

WASHINGTON, April 24—To speed up the type testing of airplane engines the Aeronautics Branch of the Department of Commerce has taken steps to increase the capacity of its aircraft engine testing laboratory at Arlington, Va., near Washington, by the addition of another torque stand to the three now in operation and by the operation of all stands on a double-shift basis, which will permit the making of two 5-hr. runs per day instead of one as at present.

Crude Rubber Steady

NEW YORK, April 21—With good buying support on any indication of recession, the crude rubber market was fairly steady last week, and will continue so in the opinion of F. R. Henderson Corp. Late reports from Akron indicate an increasing rate of tire production according to this company, which therefore looks for a continuation of this buying support.

Stocks in London have increased to 72,333 tons and those in Liverpool have increased to 22,676 tons. World stocks as of March 31 are estimated by the rubber division, Department of Commerce, at 423,000 tons, indicating a steady increase since the beginning of the year.

To Make Safety Gates

DECATUR, ILL., April 21—The Ramsey Safety Guard-rails, two one-inch wire cables, suspended by steel and malleable iron guides equipped with heavy springs to provide resiliency when struck by an auto, will be manufactured at the Decatur Malleable Iron Company plant. None of the guard rails is in use in Illinois now, but the state highway commission is expected to commence installation soon.

Illinois Registrations Gain

SPRINGFIELD, ILL., April 21—First quarter automobile registration fees in Illinois reached \$15,361,214.54 this year as compared with \$13,555,435 in the first three months of 1929. Automobile registrations for the state to date list 1,151,076 passenger cars and 164,218 trucks, an increase of 92,076 over 1929 in the first classification, 11,409 trucks and 1096 trailers.

Dains Transfers Equipment

ALLERTON, ILL., April 22—Dains Manufacturing Company, which suspended active operations here several months ago, has completed transfer of its machinery and equipment to Charleston, where the Dains line of automobile accessories will be continued as supplementary to the Charleston plant output.

Republic Steel Forms Research Unit

MASSILLON, OHIO, April 21—The formation of the Republic Research Corp. marks another step in the new organization. F. J. Griffiths, former board chairman of Central Alloy Steel Corp., will head the research units as president. Headquarters will be at Massillon.

Reporters Appointed for October Road Congress

Five Out of Seven Named
for Washington Event

WASHINGTON, April 22—Appointment of five of the seven general reporters who will present the questions on the agenda of the Sixth International Road Congress to be held in Washington next October has been announced by Thomas H. MacDonald, secretary-general of the American Organizing Commission and chief of the United States Bureau of Public Roads. The agenda includes six questions, one of which has been divided and will be presented by two reporters.

Those so far named and the subjects which they will present are: Frank T. Sheets, chief highway engineer for Illinois, results obtained by the use of cement; Dr. Roy W. Crum, director, Highway Research Board, Washington, D. C., recent methods adopted for the use of tar, bitumen and asphalt in road construction; E. W. James, chief, division of highway economics, U. S. Bureau of Public Roads, the construction of roads in new countries, such as colonies and undeveloped regions; Dr. Henry R. Trumbower, professor of economics, University of Wisconsin, correlation and coordination of highway transport with other methods of transportation; and Dr. Miller McClintock, director, Albert Russel Erskine Bureau for Street Traffic Research, Harvard University, traffic regulation, adaptation of roads to traffic in built-up areas and parking and garaging of vehicles.

Harvester Branch Celebrates

MOLINE, ILL., April 21—Completion of the 100,000th Farmall tractor at the International Harvester branch here, established three and a half years ago, was marked with appropriate ceremonies at which Cyrus H. McCormick, Jr., vice-president in charge of production, was speaker. Prediction that within 18 months the plant will be turning out 100,000 machines annually was made during the program.

Champion of Canada Sales Gain

WINDSOR, ONT., April 21—A. J. Hayes, Canadian sales manager, Champion Spark Plug Co. of Canada, Ltd., recently stated that business in spark plugs was improving annually. In 1928 his company in Canada sold 2,700,000 spark plugs, in 1929 a total of 4,200,000 plugs were sold, and this year the company was confident of achieving its objective of 5,500,000. These plugs were all made in Canada.

Kinner Books Engine Order

GLENDALE, CAL., April 21—The American Eagle Aircraft Corp. placed an order with Kinner Airplane & Motor Corp. at the Detroit Show for \$225,000 worth of K-5 100 hp. motors to be used in the new American Eagle Type 201 sport and training plane. Delivery of the engines is to start immediately.

February Tire Output Shows Slight Increase

Compared With Same Month Last Year, Decreases

NEW YORK, April 22—Tire production during February was increased slightly when compared with January but was considerably behind that of February of last year, according to estimates of the Rubber Manufacturers Association based on reports of their members who produce approximately 75 per cent of the total.

February production of casings is placed at 4,859,475 as compared with 4,745,149 in January and 6,911,591 in February of last year. Shipments were 4,474,459 as compared with 4,700,539 in January and 5,282,335 in February of last year. As a result of the increased production, inventories are ahead of January but caution on the part of manufacturers has resulted in lower inventories than those at the end of February last year. Inventories this year were 13,238,451 as compared with 12,719,137 at the end of January and 15,494,613 at the end of February, 1929.

Production of inner tubes during February is placed at 4,942,755, with shipments at 4,626,559 and inventories at 13,905,291. This compares with production of 4,913,880, shipments of 5,180,956 and inventories of 13,551,023 for January and production of 6,769,140, shipments of 5,277,676 and inventories of 16,998,855 for February of last year.

Analysis of the figures reported by member manufacturers shows the same trend of reduced production when compared with last year, but a slight increase over the beginning of the year. Shipments in almost all cases are lower with the result that inventories are heavier than they were at the end of January but in all cases they remain lower than at the end of February last year. The following comparative figures bring this trend out clearly:

Rubber Statistics

PNEUMATIC CASINGS—All Types

	Inven- tory	Produc- tion	Ship- ments
Feb. 1929.....	11,620,960	5,183,693	3,961,751
Jan. 1930.....	9,539,353	3,558,862	3,525,404
Feb. 1930.....	9,928,838	3,644,606	3,355,844

INNER TUBES—All Types

Feb. 1929.....	12,749,141	5,076,855	3,958,257
Jan. 1930.....	10,163,267	3,685,410	3,885,717
Feb. 1930.....	10,428,968	3,707,066	3,469,919

BALLOON CASINGS

Feb. 1929.....	7,472,592	3,796,660	2,976,698
Jan. 1930.....	7,139,154	2,779,864	2,805,740
Feb. 1930.....	7,436,247	2,975,992	2,750,324

BALLOON INNER TUBES

Feb. 1929.....	7,572,752	3,675,116	2,908,406
Jan. 1930.....	6,911,442	2,898,682	2,992,752
Feb. 1930.....	7,171,395	3,030,745	2,786,578

HIGH PRESSURE CORD CASINGS

Feb. 1929.....	4,073,644	1,373,691	974,185
Jan. 1930.....	2,382,959	804,783	713,713
Feb. 1930.....	2,474,495	662,419	599,599

HIGH PRESSURE INNER TUBES

Feb. 1929.....	5,159,171	1,398,156	1,046,042
Jan. 1930.....	3,233,813	783,709	889,308
Feb. 1930.....	3,243,130	675,126	680,989

Canadian Financing Gains

MONTREAL, QUE., April 21—Automobile financing figures showed an upward trend in the month of February as compared with the preceding month as well as the corresponding period of last year. In the month under review 5390 cars were financed, the valuation being \$2,842,940 as compared with 4948 cars valued at \$2,655,517 in the preceding month and 4436 cars worth \$2,523,063 in the same month of last year.

Pierce-Arrow Profits Gain

BUFFALO, April 22—Pierce-Arrow net profits for the first quarter ending March 31, 1930, were \$461,401, against \$448,532 last year, an increase of \$12,869. Last year's net contained \$173,596 profit from investments, and substantial profits from the sale of 210 trucks, with no corresponding profits in the first quarter of this year. Sales of passenger cars in the initial quarter this year were 2244 against 1769 last year, an increase of 26.9 per cent. The directors declared the regular quarterly dividend of 1½ per cent on the preferred stock, payable June 1 to stockholders of record May 10.

African Market Reported Good

WASHINGTON, April 22—The motor vehicle is gradually but surely replacing the traditional camel and donkey in North Africa, according to Trade Commissioner H. C. Scheutte, in a trade bulletin made public by the Commerce Department. Good roads are being constructed across the deserts, he points out, and bus lines operate regularly between the principal cities. From the standpoint of the American exporter, the report shows, Morocco is the most promising market in North Africa.

British Columbia Registrations Gain

VICTORIA, B. C., April 21—Automobile registrations in British Columbia for the first quarter of 1930 broke all records. For this period 67,180 motor licenses were issued, as against 62,882 for the same period last year, a gain of 4298 or roughly 6 per cent. It is expected that before the year is out 103,000 cars will be registered, and if this number is reached, it will mean that the province will have approximately one car for every six people.

USL Canadian Sales Increase

TORONTO, ONT., April 22—Sales manager E. E. Price of the USL Battery, Ltd., of this city is at present making a business trip throughout Western Canada. Prior to his departure, Mr. Price announced that USL Battery sales for 1929 were 62 per cent greater than the preceding year's and 154 per cent greater than 1927.

Union Carbide Plans Factory

CHICAGO, April 22—The Union Carbide and Carbon Company has purchased a nine-acre industrial site at Detroit, and plans call for the erection of an acetylene plant in the near future.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, April 23—More seasonable weather in the Central West last week improved retail trade, while the trend in the East, although not so pronounced, was upward. Wholesale business also improved somewhat. Some reports indicate that the general business tone is now more hopeful than at any other time since the break in the stock market last fall. There has been an increase in activity in some branches of industry, but there is still much room for improvement.

CONSTRUCTION AWARDS

Construction contracts awarded during March in 37 Eastern States, according to the F. W. Dodge Corp., amounted to \$459,119,000, which is the largest monthly total since last August. At this level construction contracts awarded were 45 per cent above those in the preceding month but 5 per cent below those a year ago.

MERCHANDISE EXPORTS

Merchandise exports during March amounted to \$347,000,000 as against \$489,849,000 a year ago, while imports totaled \$300,000,000, as against \$383,818,000 a year ago.

COTTON CONSUMPTION

Cotton consumed during March amounted to 572,552 bales, including linters, as compared with 556,127 bales during the preceding month and 708,233 bales a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended April 5 totaled 907,928 cars, which marks a decrease of 50,297 cars below those a year ago and a reduction of 11,424 cars below those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended April 19 stood at 90.7, as against 91.3 the week before and 90.8 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended April 16 were 8 per cent below those in the corresponding week last year.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended April 16 showed increases of \$35,400,000 in holdings of bills bought in the open market, of \$8,100,000 in holdings of Government securities, and of \$35,500,000 in member bank reserve deposits. Holdings of discounted bills decreased \$12,400,000. The reserve ratio on April 16 was 80.4 per cent, as against 81.5 per cent a week earlier and 79.8 per cent two weeks earlier.

Reeves Tells Metal Men

Importance of Industry

NEW YORK, April 21—"When an industry makes steady progress for 25 years to top all manufacturing products, and with exports for the first nine months last year surpassing cotton for the first time since the Civil War, its rise or fall is certain to have a big effect on general prosperity," said Alfred Reeves, general manager of the National Automobile Chamber of Commerce, addressing the National Metal Trades Association at the Hotel Astor, last week.

"With the good weather as a springboard for increased trade, the motor industry is making steady progress with production geared to sales, and an increasing interest in this year's values in motor cars by the American buyers who will always demand the latest and best for their highway transportation, whether it be trucks, buses, or passenger cars. It was not expected that we could have another record year like 1929, but production now is comparable with the figures of 1928. April production will be substantially ahead of March and this, with the broadening use of motor vehicles should be reflected in better business for many other industries."

Quebec Registrations Gain

QUEBEC, QUE., April 22—Exceeding by nearly one-third the number of motor vehicles which had been registered at this time last year, figures issued yesterday showed that to date 62,994 automobile licenses have been issued in the province of Quebec, as against 44,828 the same date of last year. It is expected that by June 1 over 200,000 automobiles will have registered. The number of used cars registered in March was larger than the number of new automobiles.

Record Attendance Claimed

DETROIT, April 16—Attendance at the All-American Aircraft Show, which closed recently at the municipal airport here, broke all previous records, according to Ray Cooper, who managed the event for the Detroit Board of Commerce. Tickets purchased at the gate totaled \$177,122.

Feature Issues of Chilton Class Journal Publications

Automobile Trade Journal and Motor Age, "Make Money from Maintenance Issue," May, 1930.

Ready May 1

Chilton Automotive Multi-Guide, First Semi-annual Issue.

Ready in May

Toledoans Honor Willys

TOLEDO, April 21—More than 5000 Toledoans turned out to do honor to John N. Willys, ambassador to Poland, and chairman of the board of the Willys-Overland Co., at a special reception held here.

Postmaster General Walter F. Brown, Senator Roscoe McCulloch, Governor Myers Y. Cooper, of Ohio; Congressman W. W. Chalmers and Mayor W. T. Jackson were among the dignitaries present at the reception of which C. O. Miniger, president of the Electric Auto-Lite Co., was general chairman. Mr. Willys plans to sail for Warsaw early in May.

Macon Heads Iron Age Staff

NEW YORK, April 22—William W. Macon has been appointed editor-in-chief of *The Iron Age*, succeeding Alvin I. Findley, who has held that position during most of the 25 years he has been associated with the publication. Mr. Findley will continue to serve as editor emeritus. Mr. Macon has been connected with the editorial staff of *The Iron Age* for 19 years, having been managing editor for the past 12 years.

Coleman Enters Two Racers

INDIANAPOLIS, April 21—Two front-wheel drive, four-cylinder motored cars have been entered in the International 500-Mile Race at the Indianapolis Motor Speedway, May 30, by the Coleman Motors Corp. of Littleton, Colorado, makers of a truck with four-wheel drive. They will be powered with motors of 183 cu. in. piston displacement and will weigh 1800 lb.

Reo Stockholders Told

No Merger in Prospect

DETROIT, April 21—Further indication that there is to be no change in the directing personnel financial structure and policies of the Reo Motor Car Co. and that no merger is in prospect accompanied the annual stockholders' meeting when the present board of directors was reelected.

R. H. Scott, president of the company, in addressing the stockholders, said that insofar as he could speak for the forthcoming meeting of the board, there will be no change in officers. The meeting yesterday was quiet, with most of the time being devoted to an explanation by officers of the new three-year voting trust plan. Those addressing the stockholders in addition to Mr. Scott were R. E. Olds, chairman of the board and founder of the company; William Robert Wilson, vice-president and general manager; E. E. Bates, secretary and treasurer, and Walter S. Foster, legal representative, who described the voting trust.

Schrader Entertains Press

BROOKLYN, N. Y., April 21—A. Schrader's Son, Inc., acted as host to a gathering of automotive business papers' representatives at their Brooklyn plant today. A feature of the program was a plant inspection tour, which preceded luncheon. In the afternoon, Dr. J. H. Clo read a paper dealing with Valve Design and Research. Service, advertising and merchandising were discussed in subsequent sessions.

Glider Carnival Postponed

NEW YORK, April 22—Postponement of the New York Glider Carnival till late in June was announced today by Edward P. Warner, chairman of the Carnival committee. The event was originally scheduled for April 25 and 26 at Queens Borough Golf & Country Club, Bayside, L. I.

Fleet Incorporates in Canada

OTTAWA, ONT., April 21—Fleet Aircraft Corp. of Canada, Ltd., has been incorporated under a Federal charter with authorized capital of \$100,000. The company will be located at Erie, Ontario.

Calendar of Coming Events

SHOWS

Berlin, International Automobile..Nov. 6-16

CONVENTIONS

National Council Meeting of the U. S. Chamber of Commerce, Washington.....April 28
U. S. Chamber of Commerce Annual Meeting, Washington...April 28-May 1
American Gear Manufacturers Association, Annual Meeting, Cincinnati.....May 1-3
Associated Business Papers—Spring Meeting, White Sulphur Springs, Va.....May 5-6-7
National Association of Credit Men, Annual Convention, Dallas...May 12-16
National Aeronautic Meeting (Auspices A.S.M.E.), Dayton, Ohio...May 19-22
National Foreign Trade Conference, Los Angeles.....May 21-23
Society of Automotive Engineers, Summer Meeting, French Lick Springs May 25-29

Automotive Engine Rebuilders' Association, Convention, Chicago..May 26-28
National Conference on Street and Highway Safety, Washington..May 27-29
National Automobile Chamber of Commerce, Annual Meeting, New York June 5
A. S. M. E., Semi-Annual Meeting, Detroit.....June 9-12
A. S. M. E., Oil, Power & Gas Div. State College, Pa.June 12-14
World Power Conference, Berlin..June 16-25
Railway Supply Mfrs. Assn., Meeting and Exhibit, Atlantic City..June 18-25
American Railway Association, San Francisco.....June 23-26
American Society for Testing Materials, Annual Meeting, Atlantic City.....June 23-27
Steel Founders Soc. (Midsummer Convention) White Sulphur Springs June 26-28

Eastern States Exposition, Springfield, Mass.Sept. 14-20
National Safety Council, Annual Safety Congress, Pittsburgh....Sept. 29-Oct. 4
Sixth International Road Congress, Washington, D. C.Oct. 6-11
Exhibition—American Roadbuilders Association, Washington, D. C....Oct. 6-11
Motor and Equipment Association, Convention, Cleveland.....Nov. 10-14

SALONS

Chicago, Drake Hotel.....Nov. 8-15
New York, Commodore Hotel..Nov. 30-Dec. 6

RACES

Indianapolis.....May 30
Belgium.....July 6-6
Germany (Grand Prix).....July 13
Belgium (European Grand Prix).....July 20
Spain.....July 27
Italy (Grand Prix).....Sept. 7
France (Grand Prix).....Sept. 21